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* General studies, see also individual crops.

Plant Breeding Abstracts.

Vol. XIII, No. 3.

Part 1. Empire Section

STATISTICS 519

647. FISHER, R. A. 519.24:631.421

New cyclic solutions to problems in incomplete blocks.

Ann. Eugen. 1942 : 11 : 290-99.

Cyclic solutions are given for the problems of randomized blocks and Youden's squares for the cases associated with completely orthogonal 8×8 and 9×9 squares.

An examination of the 9×9 squares derived from the second solution shows that there is only one species of Latin square, but two species of tetics, Graeco-Latin squares, and two species each of pentics and of hexics.

The solutions hitherto given of orthogonal 9×9 squares appear both to be the same as that derivable from the cyclic solution. Author's summary.

BREEDING 575

648. BELL, G. D. H. 575:633(41)

Crops and plant breeding.

J. Roy. Agric. Soc. 1942 : 103 : 1-11.

In a general review of recent published work, notes are given on the behaviour of the new wheat variety Steadfast on different soils and on the winter-hardiness of the new oat variety Picton.

It is suggested that control of the potato viruses X and A which are responsible for certain forms of mosaic and mottle can be achieved by growing virtually immune varieties where top necrosis is caused by these viruses.

649. 575:633(42)
Thirty-third Annual Report of the John Innes Horticultural Institute
for the year 1942 (1943) : Pp. 18.

The cytological behaviour of a kale x swede F_1 suggests that the 38 chromosome kales originated as allotetraploids, presumably by crossing between the cabbage type ($2n = 18$) and the turnip ($2n = 20$).

Pollination experiments with cucumbers and vegetable marrows have shown that the pollen deteriorates very rapidly and loses its viability almost entirely after 24 hours. Parthenocarpy in cucumbers segregated as a simple Mendelian character with conditional dominance, the heterozygotes forming parthenocarpic fruit at high temperatures and seeded fruits at low. Two more cross-incompatibles have been found in diploid cherries. Incompatibility was not affected by α -naphthalene acetamide, which caused parthenocarpic fruit formation however in pears.

Grouping of bivalents in secondary polyploids is due to attraction between heterochromatic regions; it is non-specific and does not necessarily give the true constitution of the chromosome set.

The rogue character in tomatoes has been shown to be due to maladjustment of growth hormones in the terminal shoot. It is inherited as a polygenic character. Seedlings from intervarietal tetraploid tomatoes are a promising object for selection.

Interspecific crosses in *Rubus* have been continued. The Merton Thornless blackberry will, it is hoped, be introduced into cultivation next year.

The genetics department has given much attention to polygenes, which form balanced combinations within the chromosomes under the action of natural selection and provide a store of variability (cf. "Plant Breeding Abstracts", Vol. XIII, Abst. 378).

Hybrid sweet corn has been developed and grown successfully in Cheshire.

Fertile hybrids between *Phaseolus vulgaris* and *P. multiflorus* have been obtained.

Polyploids have been produced in a number of species by colchicine treatment.

Bigger harvests.

Soviet War News 1943 : No. 517 : p. 3.

"The Timiryazev Agricultural Academy has been reviewing the results of research carried out since the war. Achievements in plant breeding are particularly encouraging. Academician Zhukovsky has evolved useful new varieties of wheat and rye. His new wheat hybrid with a globular kernel, his perennial rye hybrid with a much larger kernel than normal, and his new hardy varieties of barley, which can stand sharp temperature changes, are all remarkable for their high fertility.

Academician Zharbak made a report on new wheat varieties with large kernels. Khokhlov reported the development of a new kind of winter wheat with larger ears than usual and a large kernel".

651. DARLINGTON, C. D.

575:633(48.5)

Production genetics in Sweden.

Nature, Lond. 1943 : 151 : 183-85.

During a recent visit to Sweden, the author was able to appreciate the importance of breeding to a country obliged by war conditions to be self-supporting.

Improved seed has increased the production of wheat by one quarter and of sugar beet by nearly one half of the total harvest.

The organization of plant breeding at Svalöv is described and the use of modern methods of plant breeding, particularly the use of colchicine in the production of polyploids is cited.

The co-ordination of the work of the various institutes and universities with a national policy is held to be fundamental.

R. M. I.

652. BURNS, W. and

575:633(54.1)

PAL, B. P.

582:576.312(54.1)

The relationship of agricultural science with taxonomy and cytology.

Roy. Bot. Gdn, Calcutta 1942 : 150 : 23-1—23-6.

The authors review the work, most of which has already been dealt with in "Plant Breeding Abstracts", on the geographical distribution, genetical behaviour and chromosome numbers of cotton, sugar cane and rice; they also give the general concepts of the classification, origin and evolution of the above genera and their species, which have been deduced from the work under review.

They discuss the problems connected with the three species of *Brassica* grown as oil-seed crops in India, giving the centres in India where these problems are being considered and review the cytological studies of the genus.

Mention is made of the classification of rice and cotton prepared by two sub-committees of the Imperial Council of Agricultural Research in collaboration with the Imperial Central Cotton Committee.

653. PAL, B. P. and

575:633(54.1)

RAMANUJAM, S.

Recent advances in plant breeding with special reference to the work of the Imperial Agricultural Research Institute.

Roy. Bot. Gdn, Calcutta 1942 : 150 : 24-1—24-10.

In the section of this paper dealing with advances made in plant breeding in countries other than India, the authors review the results obtained from studies on single plant selection and hybridization, hybrid vigour, the search for new genes, wide crosses, artificial induction of mutation, genetics of physiological characters, vernalization and plant hormones.

The rest of the paper is devoted to the work undertaken by the Imperial Agricultural Research Institute on cereals, pulses, root crops, stimulants and vegetables. The recent work of this institute includes the induction of polyploidy by colchicine treatment in gram and in two tobacco hybrids, obtained in 1936; the development of wheat varieties immune from or highly resistant to flag smut; studies on the production of commercially valuable potato strains with high resistance to Late Blight and on flowering, sterility, dormancy of the tubers and cold resistance in the potato; the maintenance of pure lines of chillies and the cytological study and breeding behaviour of polyploids and mutations induced in this plant by colchicine treatment; studies of hybrid vigour in crosses of a number of crop plants and the effect of vernalization. Most of the earlier work (since 1929) described in both sections has already been reviewed in "Plant Breeding Abstracts".

654. MAYA DAS, C. 575:633(54:3)
What's doing in All-India—United Provinces.
 Indian Fmg 1942 : 3 : 602-03.
 A brief description is given of the methods used to intensify the drive for increased production of food and fodder crops.
 Improved wheat seeds have been distributed.
 Improved strains of cotton, potato and sugar cane have been evolved.

655. 575:633(54.8)
Administration report of the Agriculture Department, Government of Travancore. 1116 M.E.
 Trivandrum 1942 : Pp. 52.
 A station has been opened at Monkompoo in Kuttanad and at Adoor in central Travancore with the object of evolving new and prolific paddy strains suited to the local conditions.
 Experiments are in progress with the object of selecting high yielding early strains of the popular variety Kallanda Samba.
 Since the production of comparatively high yielding pure line strains would take time, mass selection is taking place to meet the immediate needs of the local cultivators.
 It was found that the strains obtained from other paddy breeding stations matured earlier than the local varieties. Of 70 types tested only 55 were adapted to local conditions.
 Kolappala when tested with four other varieties, gave the highest percentage of functioning tillers.
 Work was carried out on the same lines at the Adoor Station, which began its work towards the end of the year and has thus only conducted work of a preliminary nature. Similar studies are also taking place at the Thiruppathisaram paddy farm in Nagercoil.
 Fifteen sugar cane varieties were tested at the Alwaye Farm. During the year it was decided to select P.O.J. 2725 and 2875, H.M. 320, C.O. 407 and 419, as the most promising varieties for further study.
 Observations on soya bean and mango varieties are also reported.

656. RODRIGO, E. 575:633(54.8)
Administration report of the acting Director of Agriculture for 1941.
Part IV—Education, science, and art. (D).
 Ceylon 1942 : Pp. D15.
 Further work is taking place on tea selection and land has been released for the extension of work on rubber breeding.
 Surat ginger has been multiplied in a disease free condition. An experimental consignment of Hong Kong ginger was attacked by soft-rot (*Pythium myriotylum*), but it was possible to isolate healthy seed pieces from the diseased clumps and these were multiplied.
 The section of this report headed botany, describes a number of selections and varietal tests on plants of economic value. Thirty-six sugar-cane varieties were tested.
 Some of the imported cotton varieties showed promise in their first season's growth at Lissa, particularly two hybrids between the South African U 4/4 type and Cambodia. Individual plant selections from each variety are being grown.
Cinchona Ledgeriana and *C. succirubra* and the hybrid of these plants showed a satisfactory growth at Boralanda. An area of an acre was opened for further trials.
 The papain tapping trial was completed and results indicated the superiority of one of the *Carica papaya* selections.
 The selection of many vegetable species for the desirable characters such as yield and resistance to pests and diseases was continued at a number of stations. Interim selections of most of the crops have been issued and the final selections will be released within the next two years. Encouraging results were obtained with certain varieties in the trial cultivation of temperate vegetables at Matale, Tabbowa and Nuwara Eliya. Further progress has been made with the acclimatization of South American potato varieties. High yielding clones have been selected within a variety of *Curcuma domestica* imported from Guntur. The selection of varieties of *Manihot esculenta* combining the characters of flavour, early maturity and high yield, was continued.
 Superior pure-line paddy selections each suited to different districts have been obtained, while further work is in progress. The nine paddy crosses under observation at Peradeniya are

being multiplied and selected to stabilize the age-factor, while the five strains of the hybrid *buiang* x *vellai perunel* isolated at Tissamaharama to stabilize the age-factor, are being multiplied. The best saline-resistant and flood-resistant varieties for different districts, and the strains which show resistance to lodging in the Wiyalegoda tract are given.

657.

575:633(71.23)

Seasonal notes by the Department of Field Crops.

Pr. Bull. Univ. Alberta 1943 : 28 : No. 1 : 1-8.

Experimental results are given together with the conclusions drawn from them regarding flax production.

In northern Alberta Redwing flax though susceptible to rust is considered the most desirable variety because of its earliness, erect habit of growth, and other characters which resistant varieties do not possess.

The conditions on which registration of seed may be granted are defined.

The methods used for breeding the new Ferax variety of alfalfa which has a relatively high seed setting capacity are described. It is realized that the variety is not perfect and breeding for greater improvement is being carried on.

Results of trials on the yield, straw strength and protein content show that Thatcher and Red Bobs are the best wheat varieties for central and northern Alberta.

Newal is recommended as the most generally satisfactory feed barley.

658.

575:633(71.24)

Annual report of the president. University of Saskatchewan.

Academic Year 1941-42.

Saskatoon 1942 : Pp. 105.

A report is given on the breeding and variety testing of grain crops carried out by the Saskatchewan Field Husbandry Association.

The wheat variety Apex is now the second most important in the State. Promising lines from the cross Thatcher x Apex are being tested.

The new oat variety Valor has been released, and appears to be a special purpose, very early maturing oat. The new hybrids possess smut and rust resistance.

The barley varieties Regal and Rex are leading smooth awned varieties in the State. The new hooded variety Warrior, which is being multiplied for distribution, should replace Colsess and Sixty Day, which are now in use. Several highly promising dual purpose barleys combining smooth awns, rust resistance and good malting quality have been produced.

The flax variety Royal which has a high yield and resists rust and wilt, is rapidly overtaking Bison as the leading variety of Canada.

It is stated that the study of breeding potentialities of varieties through bulk hybrid tests in successive segregating generations promises greater efficiency in the breeding operations and that remarkable results have been obtained in the study of intra-varietal crossing.

The association have resumed their tests of corn varieties for grain and fodder production and their study of annual legume crops. Soya beans were obtained from every available source and tested in order to determine their reactions to the climate of the State.

659.

FRASER, J. G. C.,

KALBFLEISCH, W. and

ARMSTRONG, J. M.

575:633:578.08

New miniature thresher.

Sci. Agric. 1942 : 23 : 183-86.

A new miniature thresher is described and illustrated.

GENETICS 575.1

660.

WADDINGTON, C. H.

575.113

Polygenes and oligogenes.

Nature, Lond. 1943 : 151 : p. 394.

It is pointed out that no true distinction can be made between polygenes and "oligogenes" such as is attempted by Mather (cf. "Plant Breeding Abstracts", Vol. XIII, Abst. 378); in fact a single gene may be polygenic with respect to one character and oligogenic with respect to another. It is suggested that these terms should be discarded or used only with qualifications.

661. THOMPSON, W. P. 575.12:581.165
The causes of hybrid sterility and incompatibility.

Trans. Roy. Soc. Canada 1940 : 34 : Sect. V : 1-13.

Cross-incompatibility and sterility are regarded as a more significant basis for grouping of organisms than on any other. Crossing capacity is also of primary importance in practical breeding work. The various causes, immediate and basic, of both incompatibility and sterility are analysed, with particular reference to interspecific and intergeneric cereal crosses such as those with *Triticum*, *Aegilops*, *Agropyron*, *Secale* and *Haynaldia*; the importance of the chromosome relationships of the endosperm is emphasized. Hybrid sterility is considered under two aspects, chromosomal and genic; genic effects may act directly or through their effects on chromosome pairing. Cytoplasmic effects are regarded as fundamentally genic in origin.

BOTANY 58

662. TINCKER, M. A. H. 581.142:633
Recent work on germination.

Proc. Linn. Soc. Lond. 1943 : 154 : 167-84.

Germination in various economic and other plants is reviewed and among the various aspects treated are: longevity and storage conditions, methods of inducing germination, hard seeds, after-ripening and stratification, effects of temperature and light and chemical substances, size and maturity of the embryo, seed germination and lunar phases, cytology and dormancy, and rapid methods of determining viability.

663. MATHER, K. 581.162.3:576.12
Mating discrimination in plants.

Endeavour 1943 : 2 : No. 5 : 17-21.

Some of the mechanisms designed to ensure cross-pollination in flowers are described; it is pointed out that many species equipped with such devices are nevertheless predominantly self-pollinated in nature, the devices in question being regarded as relics of some earlier phase of evolution. Self-pollination is shown to lead to high adaptation of individuals to local environment, though it reduces potential variability and hence adaptive capacity in the species.

INTRODUCTION OF NEW SPECIES 631.524

664. **List of food crop varieties available for distribution.** 631.524(67.8)

E. Afr. Agric. Res. Sta., Amari 1943 : Pp. 12.

The list contains varieties of a number of crop plants which come under the headings, grain crops, roots and tubers, pulse crops, oil seeds and vegetables.

Information is given on some of the varieties in the list and includes the colour and carotene contents of most of the sweet potato varieties, the maturity of many of the yam varieties and the colour, quality and height of some of the species of *Amaranthus*. Of the pea varieties, those which will tolerate heat are given and a drought resistant species of *Rumex* is present in the list.

PLANT DISEASES AND PESTS 632

665. PADWICK, G. W. 632-1.521.6:633:575
Recent advances in control of fungous diseases of plants.

Indian Fmg 1942 : 3 : 478-81.

The author reviews the successful and unsuccessful methods used in the search for disease resistant varieties.

A list is given of a number of the main crops and of some of the diseases for which Indian workers are selecting or using other methods to obtain varieties which are resistant.

666. 632-1.521.6:633:578.08(54)
What the scientists are doing. Testing technique. 633.491:575(54)

Indian Fmg 1942 : 3 : p. 597.

The article discusses the technique used for testing varieties of different crops for resistance to disease and states the intention of the Imperial Council of Agricultural Research of providing cultivators with seed potatoes tested for a number of generations.

667. NOBLES, M. K.

632.4:575.11

Secondary spores in *Corticium effuscatum*.

Canad. J. Res. 1942 : 20 : Sect. C : 347-57.

Haploid mycelia derived from single basidiospores from the same fruiting body of *C. effuscatum* Cooke and Ellis fall into four groups which may be represented as AB, ab, Ab and aB. Clamp connexions are only formed when haploid mycelia of complementary constitutions are brought together (AB + ab or Ab + aB). Complete compatibility exists between haploid mycelia derived from basidiospores from different fruiting bodies.

Chlamydospores and conidia are produced by both haploid and diploid mycelia. Chlamydospores reproduce the generation on which they are borne. Attempts to produce mycelia from conidia produced on haploid mycelia were unsuccessful, but they were found to diploidize a haploid mycelium of complementary constitution. Conidia from diploid mycelia when germinated on malt extract agar produced haploid mycelia of two types, corresponding to the constitution of the two parental haploid mycelia. The conidia of both haploid and diploid mycelia can be seen in cytological preparations to be uninucleate.

J. L. F.

668. CRAIGIE, J. H.

632.452:575.12

Heterothallism in the rust fungi and its significance.

Trans. Roy. Soc. Canada 1942 : Sect. V : 19-40.

The earlier views expressed by many authors on sexuality in the rust fungi are mentioned. The experimental evidence and the cytological studies on heterothallism are given and the rusts which are heterothallic are listed.

Inter-varietal crosses have been made between varieties of *Puccinia graminis*. The hybrids obtained from the crosses are described. Inter-racial crosses have been made in three or four different rusts and inbreeding studies on the F₁ hybrids and on subsequent progeny have brought to light a considerable amount of information, which is given in the paper, concerning the inheritance of pathogenicity and other characteristics.

Various abnormalities which occur as the result of inbreeding certain races for several generations, but rarely occur in nature, are also discussed.

CEREALS 633.1*

669. CRAWFORD, D. C.,

HAMERSMA, P. J. and

MARLOTH, B. W.

633.1:581.6(68)

The chemical composition of some South African cereals and their milling products.

Sci. Bull. No. 20 Dep. Agric. For. S. Afr. 1942 : Chem. Ser. No. 171 : Pp. 100.

The bulletin and appendix contain tables set out to show the chemical composition of different grades of South African maize, oats, rye, kaffircorn and wheat together with their products. There is a table comparing the composition of South African and American cereal grains, meals and flours.

Notes on the history and origin of the cereals are given.

WHEAT 633.11

670.

633.11(93.1)

Wheat.

N.Z. Off. Yearb. 1942 : 335-36.

In the section on wheat particulars are given of the three groups of varieties and of individual varieties covering 88% of the total area of wheat threshed for the harvest of 1941, with regard to the percentages of the area and yield for which they accounted. The area sown with Cross 7 accounted for 41.6% of the total.

671. SANSOM, T. K.

633.11:582(68.9)

A description of the more common Rhodesian wheat varieties.

Rhod. Agric. J. 1942 : 39 : 477-83.

SANSOM, T. K.

Wheat varieties tested at the Plant Breeding Station, Salisbury, and available for distribution.

Rhod. Agric. J. 1943 : 40 : p. 6.

The writer states that the object of his paper is to give a description of the more commonly

* See also Abst. 658.

grown wheats in Rhodesia and it is hoped that this will form a nucleus around which eventually a good workable classification will be built. It is his opinion that with a description of varieties the criteria used must be observable in the field and must be as constant as possible under varying environmental conditions. On this basis he has described twenty-nine varieties using for his description the characters bearded or beardless, hairiness or smoothness of the glumes, colour of the grain, and density and shape of the ear. The description is illustrated by photographs of the head of each variety.

In the second article the author lists 16 of the 29 wheat varieties he described in the previous issue and says that these 16 are now available for distribution.

672. NEWTON, M. and
JOHNSON, T. 633.11-2.452:576.16:631.521.6:575
Adult plant resistance in wheat to physiologic races of *Puccinia*
triticina Erikss.

Canad. J. Res. 1943 : 21 : Sect. C : 10-17.

Asserting the existence of adult resistance of certain wheat varieties to some physiological races of *P. triticina* and recognizing the importance of identifying varieties with such resistance, the authors undertook the work described in this paper.

Data are given which compare the reaction, in the greenhouse, of 8 wheat varieties in the seedling and heading stages to the physiological races, 1, 2, 15, 27, 28, 29 and 71.

The varieties Thatcher, Apex, Marquis, Kenya and Reward, which as seedlings were susceptible to all these races, showed some resistance in the heading stage to one or more races. McMurachy proved equally susceptible in both stages to all of the races. Renown and Regent were resistant or moderately resistant to all in the heading stage, while Renown was also resistant in the seedling stage.

The results suggest that Renown and Regent might possess a general adult resistance to the races present in N. America. Inoculation showed that Renown and Regent were resistant or moderately so, to 12 additional races, 3, 20, 31, 34, 39, 44, 52, 58, 83, 89, 104 and 130.

Thatcher on testing with races 9, 15, 31, 41, 52, 53, 71, 76, 89 and 103, proved specifically resistant to 9 and 31 in both stages, and to 27 in the adult stage only.

In view of contrasting results obtained by Scheibe and Vohl, which might have been due to different varieties, or methods, the authors decided to test the reaction of varieties in the field. In 1940 Warden x Hybrid, Renown, Regent, Thatcher and McMurachy were sown and inoculated with races 5, 9, 71 and 76. Thatcher had a moderate adult resistance to 9 but none to 71 and 76. Renown and Regent showed adult resistance to all four races. Thus results with these three varieties agreed with those obtained in the greenhouse.

McMurachy, which was susceptible in the greenhouse at both stages, showed a slight amount of adult resistance in the field. Warden x Hybrid, which had not been tested in the greenhouse, was immune or highly resistant to the four races.

Thatcher in the field and greenhouse at Winnipeg was susceptible in both stages to all races except 9, 27 and 31. The differences in results obtained by Vohl may possibly be attributed to using pathogenically different races of fungi in Germany as compared with those used in Canada.

673. ANDERSON, J. A. and
AITKEN, T. R. 633.11:664.641.016(71)
The quality of western Canadian wheat, 1942 crop.

The quality of western Canadian wheat, 1942 crop. Bd. Grain Comm., Grain Bd. Lab., Winnipeg, Manitoba

Bd Grain Comm. Grain Res. Lab., Winnipeg, Manitoba 1941 : Pp. 22.

Information regarding hard red spring wheat is given on seeding, growing, harvesting conditions, production, grading, carry over and marketing. Quality of the grain is detailed based on the results of experimental milling and baking tests.

Quality of the grades is detailed, based on the results of experimental milling and baking tests, and of physical and chemical determinations made on two sets of average samples. The first of these represents the new crop and the second both new and old.

Information on the amber durum wheat with regard to production and grading is given. The quality of the wheat, flour, semolina, and macaroni, is described.

Tables, graphs, farinograms and extensograms are given which present the results obtained on both wheats.

674.

Oat varieties.

Mon. Rep. Minist. Agric. N. Ire. 1943 : 17 : 342-43.

In this report by the Ministry of Agriculture of Northern Ireland it is stated that varieties should be chosen with reference to particular districts and that locally bred varieties are much more likely to be successful than imported strains since in the course of their development locally bred varieties are influenced by environmental conditions and the better adapted types are selected both artificially and naturally.

The oat varieties Victory and Crown are practically indistinguishable in appearance and yet they respond very differently to growth conditions.

The varieties are given which are suitable for growth in different districts possessing heavy soils, medium and light soils respectively.

A new variety Stormont Grandee has been produced from the cross Potato x Thousand Dollar. It is hoped that it will be of greater value for growing on medium soil than Potato.

675.

633.13-2.7-1.521.6:575(42)

Frit fly.

Adv. Leafl. Minist. Agric. Fish., Lancs. 1943 : No. 110 : Pp. 4.

The oat varieties Onward, Royal Scot, Golden Rain II, Star, King and Victory are susceptible to attack by the frit fly. Eagle shows some resistance and since it has a satisfactory yield, quality and standing power, it is recommended where late sowing cannot be avoided.

The first tested hybrid variety with satisfactory seed quality, resistance and standing straw, which can be used for late sowing will be available in the spring of 1943 under the name Sandford.

The variety Resistance can be used for early planting since it tillers well and a high proportion of the tillers survive.

MAIZE 633.15*

676. THOMPSON, R. W.

633.15-2.7-1.521.6:575.12

The corn borer situation in Ontario in 1941 with notes on hybrid and broom corn infestation.

72nd Rep. Ent. Soc. Ont. 1941 (1942) : 12-15.

[From Rev. Appl. Ent. Ser. A. 1943 : 31 : p. 128].

In this survey of corn borer attack in Ontario, the reduction in infestation is attributed partly to an increased use of hybrid maize.

Investigations on the resistance of various strains of maize were continued and 49 standard varieties and hybrids were tested. The annual average borer population of each strain in 1941 and of the strains tested in 1938-1940 is shown. Population counts were also made on four varieties of broom corn in small plots. The number of larvae per 100 stalks, which was 12 in two varieties and 15 in a third, was as high as 29 in the fourth.

677. SCHINDLER, A. J.

633.15-2.8-1.521.6:575.14

Insect transmission of Wallaby ear disease of maize.

J. Aust. Inst. Agric. Sci. 1942 : 8 : 35-37.

Experiments with 10 insect-proof cages each containing about 20 maize plants of a susceptible single cross hybrid and 5 plants of a resistant single cross demonstrated that the vectors of wallaby ear are jassids and that *Cicadula bimaculata* is mainly responsible for carrying the disease which is probably a virus.

Hybrid strains of maize show varying degrees of resistance which can be related to some of their parent inbred lines. Though a fair degree of resistance has been observed to exist at present, it is hoped that further experiments will produce inbred lines of greater resistance and may throw some light on the genetics and also the physiological nature of resistance.

BARLEY 633.16

678.

633.16:575(54.3)

DAS, C. M.

633.51:575(54.3)

What's doing in all-India. United Provinces.

Indian Fmg 1942 : 3 : 498-500.

Among the crops on which investigations are in progress reference is made to the selected barley types obtained from material collected in various districts between 1934 and 1938; a

* See also Abst. 649.

few like 35/84 and 35/86 seemed to be better than the standard C251 under irrigated conditions; types like 35/44 and 35/25 have done better without irrigation. Efforts are being made to produce hybrids which combine the high malting qualities of C251 with the high yielding power of a strain like IP21. Hybrids J331-12, Baldia I and XVI which give good yields and show resistance to lodging and rust infection are being crossed with C251. Varietal differences in the nitrogen contents are shown, C95 having the highest.

The sugar cane variety Co453 which shows resistance and gives a good yield has been found to suffer very little from frost as compared with other varieties tested.

Of the survey cotton material collected during 1933-35, the strains D, A, 34/4 and 35/6, are promising. Some of the selections from C520 were superior in quality to C520 "bulk".

679. ANDERSON, J. A. and
EVA, W. J.

633.16:581.6(71)

Protein survey of western Canadian barley 1942 crop.

Bd Grain Comm. Grain Res. Lab., Winnipeg, Manitoba 1942 : Pp. 16.

Tables are given on the following data: the protein contents of different grades and the number of ears inspected during the period August 1st to October 31st for 1942 and 1941, which shows that the protein content was 1.3 units lower for 1942 than for 1941; the protein range of different grades from each province; the number of survey samples falling within 0.5% protein range; protein content and range for grades from each group district in each province; the protein range of mean content for barley from individual points for transport in each province and the protein content of "cumulative averages" for each grade.

A summary of the results of protein surveys for the years 1938 to 1942 is given and the methods of collecting and analysing samples are described.

Three illustrative maps are included in the bulletin.

680. MEREDITH, W. O. S.,
OLSON, P. J. and
ROWLAND, H.

633.16:581.6:575(71)

Cultural studies with barley. III. The effects of cultural practices on malting quality.

Sci. Agric. 1942 : 23 : 135-53.

There is already ample evidence to show that in the production of malting barley the selection of a suitable variety is of first importance.

Samples representing three varieties of barley, O.A.C.21, Mensury and Gartons were tested for malting quality in order to determine the effect of cultural practices on the yield. It is considered that the malting quality may be discussed in terms of percentage heavy kernels, nitrogen content and malt extract.

O.A.C.21 and Mensury were equal in malting quality and similar in all reactions, while Gartons, which has been graded as a malting barley, was inferior to these varieties and differed from them in its reaction to changes in cultural practices.

Seeding later than the beginning of May affected all varieties, but Gartons was affected least. Gartons needs a lighter rate of seeding than did O.A.C.21 and Mensury.

681. RAW, A. R.

633.16:581.6:575(94.8)

Research barley. A new variety.

J. Dep. Agric. Vict. 1942 : 40 : 521-23.

Research barley originated as a cross between the variety Prior and Plumage Archer. The new variety, which was selected for yielding ability and high quality of the grain, is an early mid-season barley and exhibits the more desirable characteristics of its parents. At the same time it is free from the "neck-breaking" habit of Plumage Archer and is less susceptible to caterpillar attack than Prior.

In areas of high rainfall, where conditions during ripening are relatively temperate, Research outyields its parents. However it is unable to adapt itself to areas where restricted rainfall, associated with the relatively sudden onset of hot weather, results in a sharp curtailment of the ripening period.

The new variety produces a grain of exceptionally low nitrogen content. It was shown by commercial malting tests, that as with other varieties possessing a low nitrogen content, Research has a superior malting quality which it retains even under unfavourable weather conditions.

MILLETS AND SORGHUM 633.17

682. KRISHNASWAMI, N. and 633.171:581.45:576.16
 RANGASWAMI AYYANGAR, G. N. 633.171-2.112-1.521.6
Anatomical studies in the leaves of the millets.
 J. Indian Bot. Soc. 1942 : 21 : 249-62.

Earlier literature on the subject is briefly reviewed. The present detailed study was undertaken to provide a convenient source of reference for the breeder. The following species were examined: *Andropogon Sorghum*, Brot. (*Sorghum durra*), *Pennisetum typhoides*, Stapf and Hubbard, *Setaria italica*, Beauv., *Paspalum scrobiculatum*, L., *Echinochloa colona*, Link. var *frumentacea* C. E. C. Fischer, *Panicum miliare*, Lam., *Panicum miliaceum*, L., *Eleusine coracana*, Gaertn.

The relation between drought resistance and the modes of adaptation of leaves to reduced water supply is discussed with special reference to the millet species in question and many of the characters they exhibit are considered to be probably ancestral.

Leaf anatomy does not apparently give any definite clue whereby drought resistant varieties can be identified, though attention to some such characters (e.g. leaf area, stomatal distribution, epidermal structures, specialization of motor cells, lignification) may be of assistance in breeding resistant varieties.

The significance of leaf anatomy in the phylogeny of grasses is briefly touched upon.

RICE 633.18*

683. MITRA, A. K. and 633.18:575(54.3)
 GUPTA, P. S.
Rice in the United Provinces.
 Indian Fmg 1942 : 3 : 482-85.

A number of rice varieties improved by selection, have been distributed to different parts of the United Provinces where they are gradually replacing the local varieties. These improved varieties have shown high yields and possess other desirable characters such as high quality and short duration.

684. CHALAM, G. V. 633.18:581.46:581.148:576.16
An anatomical study of the shedding and non-shedding characters in the genus *Oryza*.
 J. Indian Bot. Soc. 1942 : 21 : 339-49.

Two shedding types *O. sativa* var. *fatua* and *O. coarctata* (Roxb.) and one non-shedding variety of *O. sativa*, Cuttack No. 3 were examined, special attention being paid to the formation of the abscission layer. Incomplete formation of this layer is found in some of the cultivated paddies in which bands of lignified cells all round the central vascular tissue are not involved in the chemical reaction of the abscission cell. Moreover, a certain amount of mechanical support which keeps the spikelet attached to its pedicel is provided by these bands and by the actual shape of the joint in non-shedding *O. sativa*.

FORAGE GRASSES 633.2

685. DICKASON, F. G. 633.289:582:578.088
The circumference-length ratio. A new diagnostic character for identifying bamboos.
 J. Indian Bot. Soc. 1942 : 21 : 351-53.

Diagnosis is based on the Circumference-Length Ratio—a new measurement for the length of bamboo internodes. The internodes selected are those $4\frac{1}{2}$ ft. above the ground. The ratio will represent not only circumference and length, but also the proportions of the internode.

ROOTS AND TUBERS 633.4†

686. HUTTON, E. M. 633.491:581.143.26:578.08
Breaking dormancy of the potato.
 J. Coun. Sci. Industr. Res. Aust. 1942 : 15 : 262-67.

A relatively cheap method for breaking dormancy of potato tubers is described, using acetylene instead of the more expensive ethylene chlorhydrin and thiourea. It has proved reasonably effective on all varieties except those that are extremely dormant.

C. M. D.

* See also Absts 655 and 656.

† See also Abst. 666.

687. FORBES, A. P. S. 633.491-1.524
Origin and early history of the potato.
 Nyasaland Agric. Quart. J. 1943 : 3 : 28-30.
 The paper contains a general history of the potato, its introduction into Great Britain and Europe and the trying out of different varieties. Reference is made to the Empire Collection of potatoes from South America.

688. BALD, J. G. and 633.491-2.8:576.16
 WHITE, N. H.
Potato virus X: The average severity of strain mixtures in three varieties of potato.
 J. Coun. Sci. Industr. Res. Aust. 1942 : 15 : 300-06.
 A method is described for making inoculations to *Datura stramonium* directly from the tuber. Populations of virus X strain mixtures carried in different lots of the same potato variety are stated to be similar, though the results given do not fully bear this out. The hypothesis is advanced of a natural equilibrium between strains. Though the severe mixtures tend to increase faster than the mild mixtures, a balance is maintained by the heavier yield from those potatoes with a mild strain mixture. C. M. D.

FIBRES 633.5*

689. **New Swedish plant.** 633.5-1.524(48.5)
 Text. Merc., May 15, 1942.
 (From Jute. Abstr. 1942 : 6 : Abst. 365).
 The new plant is "dinga" named after its discoverer M. C. V. Dingertz. It can be grown for 8-10 years without re-sowing and can stand winter conditions up to the polar circle. It is 59-67 in. long and about 6 stems grow from one seed. The fibres are about 2½ cm. long and a good deal stronger than cotton; their durability is about 40 times that of cotton fibre. The price should be lower than that of cotton even in peace time. Experimental cultivation at the plant improvement section of the Weibullsholm Institute in Sweden has given very promising results. An edible oil can be obtained as a by-product. It is thought that in view of the great power of reproduction of the plant the cultivation will in two or three years have reached a level that may make Sweden to a large extent independent of imported textile raw materials.

690. HARLAND, S. C. 633.51:581.162.32:575.113
Breeding of a cotton immune from natural crossing.
 Nature, Lond. 1943 : 151 : p. 307.
 Since it had been shown that some F_1 pollen obtained from interspecific crosses between *Gossypium barbadense* and *G. hirsutum* was prepotent over the self pollen of these plants, the author believed that in an interspecific cross there must be segregation for velocity of pollen tube growth conditioned by minor modifiers; if there were many minor genes for velocity it should be possible to concentrate them in new types in which self pollen would grow so rapidly that no foreign pollen would grow fast enough to fertilize. F_1 plants obtained from crossing *G. hirsutum* with *G. barbadense*, showed dominance of the factors Y for yellow corolla, P for yellow pollen and R for red plant body. F_1 pollen was applied to the female *G. hirsutum*, triple recessive for the above factors, at intervals of 1 to 8 hours after it had been selfed. A number of F_1 pollen tubes grew much faster than the self tubes. Approximately 11 plants of the composition R Y P r y p were obtained from the 4-, 5- and 6-hour treatments, and a mixture of their pollen was used for a second back-cross to *hirsutum*. A much greater number of foreign pollen tubes were able to fertilize at the 4-, 5- and 6-hour intervals. A third back-cross conducted in a similar manner produced a slightly greater number of plants from foreign pollen than were obtained in the second back-cross, and the whole population was Upland in most of its characteristics. All plants from the 4-, 5- and 6-hour intervals were self fertilized. All triple recessives were self fertilized to produce lines containing the rapid pollen tube genes, but otherwise identical with Upland. Progeny rows of the only 5 plants available were grown among mixed hybrids

* See also Absts 656, 658 and 678.

of *hirsutum*, *bardadense* and *purpurascens* ancestry. If a concentration of the required genes had been obtained, some of the plants in the 5 rows should breed true to type *r y p* and vegetative characteristics and be "immune from natural crossing".

The experiment was interrupted at this point and has only recently been resumed.

The results given are only approximate because the writer lost his notes on leaving Trinidad.

691. STEPHENS, S. G. 633.51:581.165.71:575.125(72-98)

Grafting experiments with cotton.

Trop. Agriculture Trin. 1943 : 20 : 33-39.

The difficulties of cotton seed storage in a humid climate such as prevails in Trinidad can, it is believed, be avoided by maintaining all material other than that required for immediate genetic study by grafting. A full account is here given of a grafting experiment on a field scale and of another on a small scale, the object being to study growth rates, earliness of flowering, types of bolling curve, yields of selected scions on a range of stocks, mutual interaction of stock and scion as exhibited by growth rate of scion and rootstock.

One interesting aspect of stock/scion adjustment is the production of a phenomenon analogous to hybrid vigour as a result of interaction between a stock and a scion whose vigour is determined by different limiting factors.

There were some indications of a preference of Asiatic scion for Asiatic stock and of New World scion for New World stock at low levels of stock vigour.

The data reported show that more comprehensive experiments with suitable non-arboreal material might be of value in elucidating certain general principles of stock/scion interaction which are not readily appreciable from direct studies of orchard crops.

692. 633.51:581.6:575(54.7)

PRAYAG, S. H.

633.51-2.484-1.521.6:575(54.7)

Karnatak cotton and its improvement.

Indian Fmg 1942 : 3 : 488-91.

Two Kumpta cotton strains New Jayawant and Early Jayawant, have been evolved from a cross between the wilt-resistant (*Fusarium vasinfectum*) hybrid Jayawant (Triumphant) and 15-9-9, a segregate from the Dharwar I x Rosea cross. Both strains have a spinning quality which is almost equal to that of Jayawant and possess higher ginning percentages. They are undergoing trials for yield and spinning quality in the Poona district.

By selection from Kumpta cotton the strain K.F. T-12-2-5 has been evolved, which is highly wilt-resistant and noteworthy for its high yield and quality staple and is being used for hybridization.

Gadag I, a Dharwar-American cotton (*G. hirsutum*) which is susceptible to "red leaf" blight in certain years, has been crossed with Co2. Two segregates 9-7-6-6 and 4-4-1-1 have been evolved which produce creamy white lint and are partially resistant to "red leaf" blight. 9-7-6-6 has a high yield, higher ginning percentage and better quality staple than Gadag I. 4-4-1-1 is three weeks earlier and gives a higher yield than Gadag I. Both strains are undergoing rigid yield tests.

693. HUTCHINSON, J. B. 633.51-1.524:575.127.2

A note on *Gossypium brevilanatum* Hoch.

Trop. Agriculture, Trin. 1943 : 20 : p. 4.

Describes *Gossypium brevilanatum*, a cotton relative, indigenous in Madagascar which has, like *G. kirkii*, 24 chromosomes instead of $2n = 26$ found in true cottons. These two species differ in a number of external morphological characters. Apart from the occurrence of a pair of long chromosomes in *G. brevilanatum* there was little difference in chromosome size between the two species.

Attempts to cross *G. brevilanatum* with *G. kirkii* and with cultivated cottons proved unsuccessful. E. K. J.

694. 633.51-2.484-1.521.6:578.08

What the scientists are doing. Breeding wilt-resistance.

Indian Fmg 1942 : 3 : 442-43.

A technique whereby cotton strains completely resistant to wilt (*Fusarium vasinfectum*) may be isolated under optimum conditions in a greenhouse fitted with temperature control has been developed at Poona and is described.

SUGAR PLANTS 633.6*

695. STEVENSON, G. C. 633.61:575

The present and potential value of sugarcane breeding.

Emp. J. Exp. Agric. 1943 : 11 : 38-48.

In his paper the author presents an account of sugar cane breeding based on other people's work, most of which has already been reviewed in "Plant Breeding Abstracts".

The introduction deals with the general use of certain varieties of sugar cane owing to their commercial value.

The paper continues with accounts of the history of the development of sugar cane breeding, problems which confront the sugar cane breeder and the trend of present day research.

696. 633.61:575(54)

Review of sugarcane research.

Curr. Sci. 1942 : 11 : p. 451.

Sir T. S. Venkatraman will undertake a review of sugar cane research subsidized by the Imperial Council of Agricultural Research.

This enquiry will include cultivation, suitability of varieties, possibility of preparing a schedule of practical instructions for cultivators and the control of pests and fungal diseases.

697. WALAWALKAR, D. G. 633.61:575(54)

Improved sugarcane varieties in India.

Indian Fmg 1942 : 3 : 425-27.

The article relates how the P.O.J. sugar cane varieties produced in Java, were introduced into India but later replaced by the Coimbatore varieties. Superior Co varieties adapted to particular areas were discovered; Co varieties became acclimatized to the United Provinces and Bihar; further improved Co varieties were produced and replaced the earlier ones. From 1926 thick caned Co varieties were obtained by breeding and gradually extended over large areas.

The Coimbatore Station is now noted for its breeding of improved varieties for almost every part of India.

698. DUTT, N. L. 633.61:575(54.8)

The present position of thick Coimbatore sugarcanes.

Indian Fmg 1942 : 3 : 473-77.

The thick or noble canes (*Saccharum officinarum*), are not indigenous to India though they have been grown for a long time in the Madras and Bombay Province, and in Assam and the North-West Frontier Province. Crosses have been made at Coimbatore with the Indian *S. barbieri* Jesw., with *S. spontaneum* and with other genera. The chief defects of the thick canes are a shallow root system, susceptibility to disease and a soft rind.

Breeding for improved root system, yield and hardiness has led to the production of two outstanding hybrids, Co. 419 and Co. 421, among others which are described. Further work to produce suitable early and late varieties as well as varieties resistant to pests and diseases is in progress. Intergeneric hybrids with sorghum and bamboo are also being used. R. M. I.

699. 633.61:575.12(94)

Experimental varieties of sugar cane. A warning.

Aust. Sug. J. 1942 : 34 : 337-38.

A warning is given that if any person in Australia is found to have unauthorized possession of an experimental variety, whether planted or not, the convicting magistrate must impose a minimum penalty of fifty pounds.

700. D., H. H. 633.61:581.331.3:578.08

Transport of sugarcane pollen by airplane.

S. Afr. Sug. J. 1942 : 26 : p. 497.

If sugar cane pollen is stored at 4° C. in an almost saturated atmosphere it will remain viable for a week. This fact has been used to enable sugar cane pollen to be carried by air from Washington to Colombia in S. America, and opens up possibilities of sending it to other sub-tropical countries where breeding is prevented because of the impossibility of obtaining fertile pollen under their climatic conditions.

* See also Abst. 655.

701. H....., V. M. 633.61:581.6

The keeping qualities of Co. 281 and Co. 301. An experiment.

S. Afr. Sug. J. 1943 : 27 : p. 39.

Samples of sugar cane and ratoons, about twelve months old, of the varieties Co. 281 and Co. 301, were stored in a shed and other samples were stored in the field. Some of the cane was removed at intervals of 1, 5, 11 and 13 days and determinations were made on the loss in weight of the cane, loss of sucrose, reduction in true purity of the juice and reduction of available sucrose of the juice. Although various factors which might have affected the result had to be considered, it appeared that reduction of the sucrose was more rapid in Co. 301 than in Co. 281, and the deterioration in quality shown by the loss of available sucrose was slightly greater for Co. 301 than for Co. 281. In both cases losses appeared to be large. A similar experiment on "Burnt Cane" was also performed.

702. ROSENFIELD, A. H. 633.61:581.6(62)

The deterioration of harvested sugar cane. A preliminary study of varietal trends in Egypt.

Trop. Agriculture, Trin. 1942 : 19 : 133-38.

Results are given on the drop in purity, recoverable sugar and cane weight after 4 and 8 days, of five varieties of sugar cane.

Co. 281, with the thinnest cane, lost nearly 12% of its weight in four days and 18% in eight days, while the next slimmest variety P.O.J. 105, lost 10% and 16% respectively; the other three varieties each lost 8% in four days. After eight days they showed slight varietal differences, but these were not large enough to be significant.

P.O.J. 281 justified its established reputation by losing less than 12% in purity and 14% of its recoverable sugar in four days, while the slowly inverting Cheribon lost 15% and 23% respectively. P.O.J. 2878 showed a slightly smaller loss in purity than the standard P.O.J. 105, which inverts much more rapidly than the Cheribon canes; both P.O.J. canes lost 28% of their recoverable sugar. Previous indications of the rapid inversion shown by Co. 290 were confirmed, since it lost one quarter of its purity and more than one-third of its recoverable sugar.

703. D....., H. H. 633.61-2.451.2-1.521.6(68)

Alternative cane varieties as a measure of protection against plant disease.

S. Afr. Sug. J. 1942 : 26 : 597-99.

Dr W. E. Cross has published a paper pointing out possible alternative varieties to P.O.J. 36 (cf. "Plant Breeding Abstracts", Vol. XII, Abst. 1132) which has recently become affected in the Argentine by *Ustilago scitaminea*.

Since some of the varieties mentioned are the same as those that have recently been introduced into South Africa a translation of the Spanish descriptive notes on them is given.

704. D....., H. H. 633.61-2.483-1.521.6

Experiment Station notes. Effects of red rot.

S. Afr. Sug. J. 1942 : 26 : 569-73.

In addition to comparative fertilizer trials with numerous varieties, a quarantine variety trial was carried out to determine the reaction of some new varieties to red rot under field conditions. The material planted included numerous varieties of N. Co., Co., C.P. 29/291 and P.O.J. 2725. Their performance on various farms as regards disease resistance (red rot and in some cases rust) is discussed.

Laboratory research is being continued on the cause of red rot—whether *Colletotrichum* alone or with some *Fusarium* species.

The most promising seedlings of Hawaiian and Mauritian origin have been replanted to the number of 267 and 113 respectively.

Consignments of sorghum seed have been sent from S. Africa, Nyasaland, Uganda, the Congo and other parts of Africa to the United States.

STIMULANTS 633.7

705. CHETTY, C. V. S. 633.71-575

Methods of production and marketing of cigarette and cigar tobacco in the United States of America, Canada, Java and Sumatra.

Misc. Bull. Imp. Coun. Agric. Res. Delhi 1942 : No. 48 : Pp. 91.

The portion of this bulletin which deals with breeding remarks on how the efforts of the breeder

are directed to such features as size, earliness in maturity and disease resistance. The author discusses the production of different strains and the results obtained. Attempts are being made to obtain disease free *N. Tabacum* by crossing *N. sylvestris* with *N. tomentosiformis* and building up resistance in *N. Tabacum* by crossing it with other species such as *N. glutinosa* and with other varieties of *N. Tabacum*.

He continues with a review of varieties which show resistance to the diseases Granville wilt, black root-rot, blackshank, blue mould, wildfire and blackfire, mosaic virus, and brown root-rot.

706. PATEL, B. S. 633.71:575(54.7)

What's doing in All-India—Bombay.

Indian Fmg 1942 : 3 : p. 601.

The article reports that the farmers of Gujarat have been persuaded to curtail cultivation of non-food crops and to grow more food crops.

It has been decided to offer seeds of the improved tobacco strain Keliu No. 49 (K49) only to cultivators who are prepared to reduce the area under tobacco as much as possible.

707. 633.71:575(69.82)

V. Research.

Rep. Tob. Bd Gov. Tob. Warehouse, Port-Louis, Mauritius 1942 : 7-8.

Work at the Tobacco Research Station has been directed mainly towards the production of varieties which will be acceptable on the London market. Reports on this work are included in the Annual Report of the Department of Agriculture.

Research was begun on the production of strains resistant to the Black Shank disease, but had to be abandoned.

708. 633.71-2.3-1.521.6(92.1)

ROELOFSEN, P. A. 633.71-2.4-1.521.6(92.1)
Recent research at the Deli Tobacco Experiment Station, Medan, Sumatra.

Emp. J. Exp. Agric. 1943 : 11 : 15-22.

An account is given of the organization and work of the various departments of the station, special mention being made of the research on the selection of strains for disease resistance (leaf spot and slime disease). The difficulty of combining resistance to slime disease with high quality is stressed (cf. also "Plant Breeding Abstracts", Vol. XIII, Abst. 568).

709. BAKER, R. E. D. 633.74-2.2(72.98)

Witches' broom disease investigations. III. Notes on the occurrence of witches' broom disease of cacao at River Estate, 1939-1942.

Trop. Agriculture, Trin. 1943 : 20 : 5-12.

Detailed records of the occurrence of witches' broom on cacao trees from 1939-1942 showed that trees which produce many brooms one year are likely to do so again the next year. No correlation was found between "cushion brooms" and "fan brooms" per tree. It is suggested that resistance to the disease is brought about by "some form of disease avoidance in the vegetative tissues of certain trees".

E. K. J.

710. SALMON, E. S. 633.79:575(42)

Twenty-fifth report on the trial of new varieties of hops, 1941.

J. Inst. Brew. 1943 : 49 : 9-19.

Trials of new varieties of hops.

Worcs. Agric. Quart. Chron. 1943 : 11 : 111-13.

SALMON, E. S.

Twenty-fifth report on the trial of new varieties of hops, 1941.

E. Mall. Res. Sta., Kent 1942 : Pp. 22.

Data are given comparing the yield, brewing tests and bushel weights of new varieties. Brewing tests show that "Bullion Hop" is an excellent substitute for imported American hops.

The "bud-sport" of the variety "Nonsuch", when grown at Wye and then for two years at East Malling, showed a higher percentage than its parent, of α -soft resin and total soft resins. It appears that the new varieties which are rich in soft resins when grown at East Malling are even richer when grown on deeper hop soils.

Two samples of "Brewer's Gold" from the United States of America, when grown in this country, gave a higher preservative value than the richest sample of American hops obtainable.

A report is given on the seed production and aroma of seven new varieties and of the Canterbury Golding, Bramling and Fuggle, which were grown in Canada. A new seedling of "Brewer's Gold" designated OL12 is the richest of all the hops of the 1941 growth. Samples of the richest of the American hops of the 1941 growth were shown to have a preservative value which is equalled by a mid-season variety and exceeded by two late-season varieties.

711. SALMON, E. S.,
BEARD, F. H. and
HATTON, R. G. 633.79:575(42)
633.79-2.484-1.521.6

The merits of the new varieties of hops.

J. Inst. Brew. 1943 : 49 : 29-33.

The new varieties like many other varieties tolerate the mosaic virus disease but are possible sources of infection to susceptible Golding and other types.

Data have been collected for a number of years and a summary is published in this paper on the performance of Brewer's Favourite, Quality Hop, Fillpocket, Brewer's Gold and Bullion Hop.

It is possible that among the new varieties selections resistant to the *Verticillium* wilt disease may be forthcoming.

AROMATIC PLANTS 633.8

712. PENFOLD, A. R.,
MORRISON, F. R. and
SMITH-WHITE, S. 633.8:581.6:576.16
The occurrence of two physiological forms of *Leptospermum citratum* (Challinor, Cheel and Penfold) as determined by chemical analysis of the essential oils.

J. Proc. Roy. Soc. N.S.W. 1942 : 76 : 93-95.

The essential oil obtained from the type species consists principally of the aldehydes of citral and citronellal, for which there is a high and increasing demand. Two distinct forms have now been distinguished, differing from the type species and from each other in the composition of the oils, yet identical in botanical features. Variety A. contains no citral, Variety B. contains 16-20%, as against the type which contains 45-50%.

The three forms can be distinguished by the smell of their leaves.

OIL PLANTS 633.85

713. PAUL, W. R. C. and
GAYWALA, P. M. 633.853.74:575(54.8)
The cultivation of gingelly in Ceylon.

Trop. Agriculturist 1941 : 97 : 321-26.

The problems connected with cultivation of *Sesame orientale* in Ceylon are discussed and the relative merits of three varieties Gujarat (white) Burma (Black) and Local (brown) examined. In breeding, black is dominant to brown and both these to white. E. K. J.

714. RAMANUJAM, S. 633.853.74:575.127.2:576.356.5
An interspecific hybrid in *Sesamum*—*S. orientale* L. x *S. prostratum* Retz.

Curr. Sci. 1942 : 11 : 426-28.

Sesamum orientale ($n = 13$) and *S. prostratum* ($n = 16$) were crossed during the season of 1941. Out of 91 crossed seeds sown during 1942, 11 hybrids from the direct cross and 2 from the reciprocal cross, were obtained.

The hybrids were intermediate in respect of several characters of the parents but showed dominance with regard to resistance to the caterpillar *Antigastra catalaunalis* and the virus disease called sepaloidy (or phyllody or "green-leaf" disease), which normally do great damage. There was no essential difference between reciprocal hybrids.

Twenty-nine chromosomes, the sum of the gametic chromosomes of the parents, were found in the hybrids. The chromosomes usually formed a varying number of univalents and bivalents; occasionally a quadrivalent or trivalent was also met with.

Polyploidy was induced by spraying the vegetative buds of a few hybrids with 0.4% colchicine solution. Fertility was induced as a result of the chromosome doubling.

715. SRIVINASAN, A. R. 633.853.74:581.162
Contribution to the morphology of *Pedalium murex* Linn. and *Sesamum indicum* D.C.

Proc. Indian Acad. Sci. 1942 : 16 : Sect. B : 155-64.

The author describes the development of the megasporangium, fertilization and the development of the seed in *Sesamum indicum*. In *P. murex* and *Martynia diandra* the chromosome numbers have been found respectively to be $2n = 16$ and 32.

MEDICINAL PLANTS 633.88*

716. DAVIDSON, J. 633.88(71.1)
The Cascara tree in British Columbia.

Bull. Prov. B.C. 1942 : No. 108 : Pp. 32.

The report is a revision of a previous publication of the same name. The range of distribution, distribution in British Columbia, the botanical features by which the tree may be recognized, the medicinal value of cascara, its preparation and economic utilization, and commercial planting of the tree are the points of discussion in the bulletin.

NUTS 634.5

717. MUSTAFA, A. M. and JANJUA, N. A. 634.551(54.3)
Almond growing in Baluchistan.

Indian Fmg 1942 : 3 : 539-42.

This is a general review of almond cultivation in Baluchistan and deals with the soil, water requirements, pollination, varieties, pests and yield.

E. K. J.

718. WILLIAMS, H. A. 634.551:581.6(42)
Edible varieties of almonds.

J. R. Hort. Soc. 1943 : 68 : 62-65.

Estimations were made of the hydrocyanic acid which could be obtained from different varieties of ornamental almonds grown in Great Britain.

Almonds from the varieties *Prunus Amygdalus amara*, *P. A. Pollardii*, *P. tenella* (*P. nana*) and *P. Amygdalo-persica* produce dangerous proportions of hydrocyanic acid and should not be eaten; but they may be used in small quantities for flavouring.

Almonds from *Prunus Amygdalus* Batsch. (*P. communis* (L.) Arcang.) and its variety *praecox* produce about one-twentieth of the hydrocyanic acid yielded by bitter almonds and may be used in moderation.

Almonds from the varieties *P. A. macrocarpa* and *P. A. dulcis* produce practically no hydrocyanic acid.

Hydrocyanic yield from the ordinary decorative trees, planted in the neighbourhood of London was calculated and found to be small. There was remarkably little variation in the amounts of acid from these nuts. This may be explained by the practice of propagating by budding or grafting which is commonly adopted in preference to propagating by seed. The trees appear to be confined almost entirely to *P. Amygdalus*. The almonds from these trees were found, after a general percentage composition had been determined, to provide an attractive and nutritious food.

719. SELLSCHOP, J. 634.58:581.6:575(68)
Sound advice.

S. Afr. Agric. J. 1942 : 26 : p. 507.

The Natal Common groundnut variety, which resists drought and gives a good yield, has an approximate oil content of 47-50%, while Virginia Bunch has only 43-45%.

OTHER FRUITS 634.6

720. CHILD, R. 634.61:575(54)
Coconut research scheme. Programme of experiments for 1942.

Trop. Agriculturist 1941 : 97 : 232-35.

The programme of research for the year 1942 is given.

It is divided so as to show the research to be done by the Geneticists', Soil Chemists' and Technological Chemists' Departments.

721. WOKES, F.,
 JOHNSON, E. H.,
 ORGAN, J. G. and
 JACOBY, F. C. 634.74:577.16
Vitamins in rose hips.
 Nature, Lond. 1943 : 151 : p. 279.

Using dried extracts from several tons of rose hips, mainly *Rosa canina* and *R. dumetorum* collected in Hertfordshire last autumn the writers found the carotene content equivalent to about 6,000 I.U. of vitamin A per 100 grm. Tests on samples of other species undertaken by another worker gave similar results and it may be said that British rose hips have a vitamin A value similar to that of carrots.

The vitamin C content of these dried extracts ranged from 1,300 mgrm. to 1,500 mgrm. per 100 grm. Storage experiments at different temperatures showed that the loss of vitamin C of the extracts during six months was negligible.

The vitamin P content of one of the dried extracts was found to be 520 G.L. units per grm. It is possible that there is a wide variation in vitamin P content of different samples.

722. THOMAS, A. S. 634.771:581.162
Food crops as indicator plants in Uganda. 633.171:581.02
 E. Afr. Agric. J. 1943 : 8 : 136-40.

The banana is an indicator plant of the better soils and its distribution in Uganda is noted. About 50 distinct varieties are cultivated, many of them already grown before European settlement. As far as is known, seed is never set though bud mutation may occur, and how the plant reached Uganda is unknown.

Among other crops briefly noted as indicative of different types of soils are Finger millet (*Eleusine coracana*), sorghum, Bulrush Millet (*Pennisetum typhoides*), maize, sweet potatoes, cassava (*Manihot utilissima*) and *Coleus*. Indications are given of the origins of many of these crops.

723. KUMAR, L. S. S. 634.775.4:581.49:575.247
Reverse mutation in *Opuntia decumana*. 634.775:576.16
 Curr. Sci. 1942 : 11 : 338-39.

A spineless joint (phylloclade) when planted two years ago gave rise to several subsidiary spineless joints. From one of these a joint arose which had spines on its flat surface only. The author considers this a case of a sectorial chimaera which has arisen by somatic mutation of a bud from which the joint arose. A second joint which was given off from this joint also bore spines on one side only but some were present along the margin of the spineless surface. Another case is reported when joints of spineless cactus were planted for multiplication. Joints appeared without spines and one with spines. The spiny type gave rise to joints bearing spines. The few segments which bore spines profusely are giving joints with fewer and fewer spines, which is an example of successive reversions taking place in the course of two years. It is considered that the spineless cactus is of more recent origin than the spiny cactus.

VITICULTURE 634.8

724. DUNNE, T. C. 634.835:581.162.32:578.08
Pollen-containing sprays for the cross-pollination of Ohanez grapes.
 J. Dep. Agric. W. Aust. 1942 : 19 : 210-13.

The paper shows the need for cross-pollinating the Ohanez grape and describes a method of using a spray of pollen suspended in water.

The data suggest the possibility of some method of control of setting, by adjustment of the concentration of the pollen grains in water.

FORESTRY 634.9

725. REINECKE, O. S. H. and
 WICHT, C. L. 634.972.3:575(68)
A semi-evergreen form of Lombardy poplar.
 J. S. Afr. For. Ass. 1942 : No. 9 : 19-22.

Many trees and shrubs requiring comparatively severe winters cannot be successfully grown at

the Cape. Attempts are being made to obtain varieties better suited to the climate by importation, selection and breeding. Some success has been attained and this work is being continued. In the meantime the Chilean Lombardy poplar is being tried as a means of providing a shelter belt of tall fast growing ever-green trees to protect plants subject to "delayed foliation", the functional disorder caused by the general lack of frost and the tempering influence of the sea.

Cuttings of *Populus deltoides* Marshall var. *missouriensis* Henry and of the Oxford hybrid poplars introduced from the United States are also being tested.

The Chilean Lombardy might also, it is thought, be used in genetic experiments to discover a poplar producing timber more suitable for the match industry than the Grey poplar *P. canescens* or *P. deltoides*. Hybridization of the Chilean Lombardy with *P. nigra* L. and other related poplars might be a means of obtaining a semi-evergreen, fast growing, relatively hardy but less branchy form superior to poplars grown at present.

A botanical note is appended on the two fastigiate varieties of the Black poplar *P. nigra* L., known as Lombardy poplars, and their sex forms and the recorded views on their possible genetic origin are briefly considered, with some further comments on the semi-evergreen form of the Lombardy poplar and the Grey form.

726. SHERRY, S. P. 634.975:581.165.72:578.08(68)

A note on the vegetative propagation of *Pinus insignis*.

J. S. Afr. For. Ass. 1942 : No. 9 : 23-25.

A technique, based on Field's method with *Pinus insignis* Doug. in New Zealand, has been devised whereby branch cuttings of selected stocks can be successfully rooted in nursery beds without the use of phytohormones.

The value of the results, which were most promising in afforestation and in genetic studies is indicated.

VEGETABLES 635*

727. LANG, J. M. S. 635.356:575(41)

A trial of broccoli varieties in Scotland.

Scot. J. Agric. 1943 : 24 : 113-17.

The paper describes a trial of twelve varieties of heading broccoli, conducted at Corstorphine, Edinburgh. Measurements were taken of a number of vegetative characters such as length, spread and height of leaves and an analysis of these data clearly demonstrated the heterogeneous nature of these varieties; clear statistical differences between varieties were found for most characters.

Wide varietal differences were found for winter resistance, the three outstanding varieties for the character being Royal Oak, St. George and May Blossom which headed the list when tested with other varieties at Cupar, Fife, where winter conditions are usually more severe. The outstanding varieties at Edinburgh as regards the percentage of heads marketable were May Blossom, St. George and Royal Oak and at Cupar, Royal Oak and St. George.

From all results obtained at Edinburgh, Royal Oak was considered to be the outstanding main crop variety in the trial and the best suited to local conditions; St. George was the best of the early varieties and Midsummer probably the most useful late variety.

Roscoff, a variety grown in the south-west of England, was shown, by winter-resistance tests at Edinburgh and Cupar, not to be sufficiently hardy for use under Scottish conditions.

It was established that there are correlations among the plants tested at Edinburgh between seven plant character pairs. Correlations such as these are indicators of trends, and as such may be useful in breeding work and seed selection.

A report is given on the production of vegetable seeds under Scottish conditions and describes the work being carried out at Edinburgh.

728. LUCKWILL, L. C. 635.64:576.16

The evolution of the cultivated tomato.

J. R. Hort. Soc. 1943 : 68 : 19-25.

635.64:576.356.5:577.16

The author gives a description of the history of the tomato, its introduction into the old world and the primitive and modern cultivation of the plant.

He shows how new hybrids are obtained by cross pollinating different varieties but points out the disadvantage that the plants so obtained do not breed true. He states that this may be overcome by doubling the chromosome number and that the vitamin C value of tetraploid tomato plants is higher than that of the diploid races from which they are derived. Heterosis and interspecific hybridization are also mentioned.

729. CHEEMA, G. S.,
NAZARETH, B. and
DHARESHWAR, S. R. 635.646:575(54.7)
Improvement of brinjals (*Solanum melongena*, L.) by selection in the Bombay Province.
Proc. Indian Acad. Sci. 1942 : 16 : Sect. B : 25-48.

The paper deals with the improvement of brinjals by selecting for a short maturity period, resistance to disease, and high yield of fruits with a pleasant taste and the least number of seeds.

A collection was made of 45 representative samples from all the important brinjal growing centres in the Province and their history is recorded. From a study of the fruit characters the representative types were placed in 11 groups. Other records on plant and fruit characters are given. One type from each group together with five more selections, was studied for purity of strain. From these, a large number of cultures were selected on the basis of attractive colour, the least number of seeds, medium size of fruit and yield. The behaviour during 1932 is recorded of certain promising selections. Some of the Gote and Dorli selections gave high yields and so they were tested by regular replicated trials.

The numbers of the Gote selections tested were, 28-21 (A), 32-7 (B), 32-10 (C), 34-27 (D) and Local (E). A was consistently the highest yielding variety during 1935-39. From results of a combined analysis it is shown that A, B, C and D outyielded the local selections. The statement giving the percentage increase or decrease for 1935-39 shows that A outyielded E by 26%. The fruits of this plant have a sweet taste, an attractive colour and possess the least number of seeds and most pulp.

The numbers of the Dorli selections are given as 8-3-24 (A), 8C-2-24 (B), 23-3-24 (C), 27-32-6 (D) and Local (E). A gave the highest yields during 1936-39. Results of combined analysis show that D, A and B in this order, gave greater yields than E. The percentage increase or decrease during 1935-39 shows that D outyielded the local selection by 25.46% and A outyielded it by 24.54%. The Dorli plants have the most seeds and are the smallest of the brinjals. D, however, bears larger fruit with more attractive taste and colour, with the least number of seeds, and it is an early maturing type.

730. KUMAR, L. S. S. and
ABRAHAM, A. 635.652:576.356.5:581.04
A study of colchicine induced polyploidy in *Phaseolus radiatus* L.
J. Univ. Bombay 1942 : 11 : (N.S.) Pt 3 : No. 12 : 30-37.

The authors describe three methods of technique which they used to induce polyploidy in *Phaseolus radiatus* by colchicine treatment, namely, seeds were bathed in solutions under 0.5%; wads of cotton wool were placed on the apical buds of seedlings and a solution of 0.02% was dropped on them; colchicine in agar was applied to the apical buds and axils of the first pair of leaves of seedlings. The last method was most successful. Four plants out of twenty were definitely tetraploid. This treatment stunted the growth of the apical bud. In at least one plant octoploid occurred. Chromosome counts showed that the diploid had 22 chromosomes and the tetraploid 44. Tetraploid plants had thicker leaves with larger cells and plastids.

Simultaneous division of nuclei does not take place in the apical cells of seedlings. Thus portions of the meristem become polyploid and the rest remains diploid. Both periclinal and mixo-chimaeras were formed.

The authors continue with a discussion of different types of chimaeras and the consequences of auto-polyploidy.

731.		635.652:582
	GILES, W. F.	635.651:582

Interesting types of beans.

J. R. Hort. Soc. 1943 : 68 : 73-82.

The author discusses the history, cultivation and improvement of different bean types.

Phaseolus multiflorus. This bean was introduced into this country from South America in 1633 and has four varieties in cultivation. A history of improved types is given.

In this country, most of the interest in runner beans is centred around those varieties having the true scarlet runner seed and those with the "Prizewinner" type of seed, and many selections are offered in catalogues. A cream-seeded selection with dark brown markings was fixed, and put into commerce under the name "Majestic."

The bicolour bloomed or "Painted Lady" type has also been improved, and there are now several good selections of it with larger and finer pods than the original. There are several excellent developments of the white-seeded and white-flowered forms.

Black seeded sports often appear amongst scarlet runners.

Attempts to produce a dwarf or bush type of the scarlet runner, by crossing the latter with the dwarf or French bean have not been very successful. Details of the dwarf bean under the name of Suttons Hybrid which was produced in 1899 are given.

In 1925, Suttons found amongst a seed crop of "Prizewinner", a dwarf-growing plant, which was a natural sport or mutation and breeds true to the dwarf type.

Phaseolus vulgaris. This was also introduced into Europe from South America. The classes into which both dwarf and climbing types can be placed, are given.

The uses of the pods for *haricots verts* and *haricots beurres*, and the uses of the beans from different varieties (e.g. white-seeded varieties of beans as *haricots blancs*), are described.

Varieties of beans which produce small white seeds are sometimes referred to as Rice Beans and in the U.S.A. and Canada as Pea-Beans.

A climbing bean with short fleshy pods, almost round and coloured half white and half rose brown seeds, has been given the name of Pea-Bean in this country. This bean is a variety of the continental type of Prague or Coco Bean. Some time ago another variety of this bean named "New Zealand Runner" or "London Horticultural" was grown in this country.

The author thinks that the true dwarfs arose as mutations from the tall kinds, and that consequently climbing types could not be derived from dwarf types. He describes a number of climbing French beans.

Faba vulgaris. This is generally supposed to come from Egypt or Persia. A description is given of the three groups in which the varieties are placed and of their varieties. *Phaseolus lunatus* and *Soja hispida* and their uses are also described.

732.	ARNOLD, H. C.	635.655:575(68.9)
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Soya beans (continued).

Rhod. Agric. J. 1942 : 39 : 418-32.

The varieties Otoxi and Bilton which were produced eight years ago have proved their value as fodder in Mashonaland; but, like all the older varieties, they demanded immediate attention when the seed crop was ready to harvest.

The chief distinguishing features are given of the strains Jubiltan Nos. 65, 67, 77 and 109, which resulted from crosses between a non-shattering variety and the older strains. Jubiltan No. 77 of which an analysis is included gave the highest yield. Jubiltan Nos. 65, 67 and 77 were compared with Hernon strains Nos. 18, 55 and 107. It is shown that No. 107 equalled and No. 55 surpassed Jubiltan No. 65 in yield of total fodder. Since Hernon No. 55 has not been included in previous trials it is too early to affirm that its productive capacity is equal to that of Jubiltan No. 65, but it seems to be nearer the yellow-seeded fodder, or dual purpose type than any of the Hernon strains previously established.

733.	CALDER, R. A.	635.656:575(93.1)
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Field peas. The development and performance of a new blue and a new white field pea.

N.Z. J. Agric. 1942 : 65 : 347-49.

A large number of crosses were made at Palmerston North in 1932 with the aim of breeding an improved blue field pea. The Blue Prussian variety was used as one of the parents and eleven others mostly garden varieties were used as the other parent.

It was decided in 1941 to retain a selection from the cross Blue Prussian x Harrisons Glory, which is designated Mammoth Blue.

It is considered that Mammoth is a definite improvement on Blue Prussian in that it tends to give higher yields and produces larger and more attractive seed of equivalent cooking quality.

Also in 1932, a wide range of crosses was made between twelve varieties of garden and field peas to obtain a new white splitting pea. After the first crossing, single plant selections were made each season from the most promising lines and by 1941 it was decided to retain the cross Blue Prussian x Greenfeast, which is designated "White Prolific."

White Prolific has a greater yield than White Ivory, one of the most commonly grown varieties. Though the quality of the seed is acceptable it is possibly a little inferior.

Part II. Foreign.

BREEDING 575

734. HEINRICH, W. 575:633(43)
Die Pflanzenzüchtung des Donaulandes in ihrer Bedeutung für den Süd-
osträum. (The plant breeding of the Danube basin and its significance
for the south-eastern zone).

Wien. landw. Ztg. 1942 : 92 : 127-28.

A general account of the soil and climate of the Danube district and the work on plant breeding there undertaken. The crops investigated are cereals, including maize, soya beans, fodder plants and beans and peas.

R. M. I.

735. *ÅKERMAN, Å. 575:633(48.5)
Årsberättelse över Sveriges Utsädesförenings verksamhet under år 1941.
(Annual report on the work of the Swedish Seed Association during
the year 1941).

Sverig. Utsädesfören. Tidskr. 1942 : 52 : 161-211.

Full details of the aims are set out in the breeding of cereals and other crops, including herbage plants.

The new varieties and élites in the Association's list of achievements during 1941 included: the winter wheats Vg 01340 (from Ankar I x Borevete II), harder than many of the improved varieties and with good grain quality; Vg 01312 (from Ankar I x 01200) remarkably winter-hardy with good grain quality and strength of straw; Vrm 01220c (line selected from Vg 01220a from the cross Kron x Jarl), high yielding with stiff straw and very winter-hardy; Vrm 01134 [from 0912 (a sister variety of Solvete II) x Svea I]: it is a sister variety of Pärl, very winter-hardy and stiff strawed, but higher yielding than Pärl—The Oat 01430 from Sölv x Örn, equals Örn in yield but larger and plumper kernels—Sugar beet X 032, a new variety from a group cross—The sugar mangel [fodder sugar beet] Alfa nova, a new élite—The new linseed 0100 obtained from an Argentine mixed variety.

In breeding for cold resistance confirmation of the successful performance of certain varieties was obtained by artificial freezing experiments.

Among the more promising new hybrid combinations of oats, made at Svalöf the previous year, were crosses between Solhavre I and lines from the 01430 series (Sölv x Örn).

In work on herbage plants studies of meadow foxtail, smooth brome grass, etc. followed the pre-arranged plan. Studies of progeny of smooth stalked meadow grass and white clover after X-ray treatment were begun.

Potato research continued as on previous lines, including vitamin C content determinations. With the exception of the forms from South America, some direct descendants of that material and the collection of different varieties, the experimental material was transferred to the Borrestad Estate.

Some of the new clones continued to give good crops and have now been handed over for trials by other bodies.

The seed plants did well, and new crosses were made on a satisfactory scale. The starch determination technique was further investigated and the final comparison of the results obtained in recent years was begun. A report on the work on Vitamin C content and the objects and methods of potato improvement is to be published.

About 2,600 beets out of 5,600 with the highest polarimetric figures for sugar content were chosen for seed.

In the winter of 1940-41 seed was raised from 10 lots of club root resistant swedes and turnips with 2 lots of Barres crosses in the greenhouse with electric lighting at night. Some plants from colchicine treated seed of a Barres F₁ were also grown in the greenhouse and some of them set seed. Two, which judging by the stomata and pollen, were assumed to be polyploid, were crossed together and also separately with tetraploid sugar beets and a quantity of seed was obtained which produced tetraploid beet plants. No less than 2,300 of these fodder beets are being grown at Svalöf.

Much work is in progress on sunflower and other oil crops, as well as on flax, hemp and several other fibre plants.

* An extended summary of this report is on file at the Bureau.

Several F_3 lines from a blue sweet lupin x blue bitter lupin showed considerable superiority to sweet lupins and were also promising otherwise. Spontaneous hybridization is however so frequent that the production of strains entirely free from the bitter principle will apparently be unexpectedly difficult. Some lines selected in 1940 from the wild yellow lupin from Portugal seem valuable for further hybridizations.

No mutations could be detected in the plants irradiated with X-rays. The experiment is being continued, as well as the work on the importance of the time of harvesting for seed quality.

X-ray irradiation of soya bean was also carried out on a large scale and important findings were obtained as regards the dosage. The plants derived from the material of the previous year exhibited several aberrant types which are probably induced mutations and work on the same lines is being continued, as the above types comprised forms of practical value, e.g. some stiffer stemmed and earlier than the original variety.

Trials were made of some new poppy varieties from Hungary which were said to have a higher morphine content and also a white seeded variety grown by W. Söltöft of Stänby were included in the trials. Selection and hybridization were used with the object of producing an early, high yielding type whose capsules do not dehisce at maturity. A further aim was to increase drought resistance among the existing collection of varieties. The possibility of increasing mutation rate by X-ray irradiation is being examined.

Maize selection and hybridization was continued to obtain early, high yielding varieties. Marked differences in earliness, quality and other important features were recorded between the types among old Swedish hop strains collected in 1940 in Central and Northern Sweden and planted at Svalöf. The chemical aspects of quality are still being studied in collaboration with the Stockholm breweries.

In spite of damage to tobacco by sandstorms it was possible to harvest seed from the F_1 of the crosses made in 1940 and new crosses were made according to plan.

The Chromosome Division continued the study of the tetraploids that had been produced mostly by colchicine treatment—(1) About 1,000 rows of tetraploid flaxes of Herkules, Blenda, 041, Concurrent, Gzekacs, Palermo, with diploid controls; (2) 177 rows of diploid and tetraploid F_2 generations from crosses between these varieties; (3) X-ray treated seed of Herkules, Concurrent and Palermo tetraploids. The results suggest that there is no immediate prospect of any practical success from chromosome doubling applied to flax, as all the tetraploids showed reduced productivity and fertility.

Unfortunately the same must be said of the tetraploid soya bean plants.

More promising results were obtained in the tetraploid clovers. In trials with red clover (including different combinations of Merkur, Wambåsa, Ultuna and Offer) alike and white clover, the tetraploids all through yielded 30–40% more stem and leaf than the diploids.

New varieties of octoploid timothy produced by the twinning method are being multiplied. About 70 families of tetraploid Hilleshög and Vilmorin sugar beets with hybrids between them are being grown in the field. About 30 of these families have shown a higher average root weight and a higher sugar yield than the diploid controls. Nearly 5 kg. of seed were produced by 73 tetraploid sugar beets of Hilleshög ancestry. A large number of tetraploid fodder beets produced by colchicine treatment are to be grown in the field as the C_2 generation. The cytological effects of colchicine on the reduction division in rye, etc. were also studied, including its action on material irradiated with X-rays, as well as the chromosome behaviour in the reduction division of haploid rye and an analysis of triploids in sugar beet progeny, special attention being paid to different types of trisomic beets.

The Chemical Division, the Cereal Laboratory and the Flax Laboratory were in active operation during the year.

A detailed account is given of the results of experiments carried out at the Affiliated Branches of the Institute in the improvement of the various crops by variety trials as a sequence to work on selection and breeding.

A report is given on the newly established Regional Vegetable Breeding Laboratory at Charleston, S.C., which in co-operation with the 13 Southeastern states is working on the improvement of garden crops for the South. The immediate objectives of this station are the development of high yielding, hardy disease resistant garden peas, tender, green and wax snap beans withstanding diseases and heat, tender sweet corn resistant to corn earworm and disease and tomato varieties resistant to wilt and the leaf spot diseases, hardier cabbage varieties which will produce good heads after cold weather and disease resistant melons with higher sugar content and better eating and keeping qualities.

Numerous lines of large podded market types of garden peas resistant to disease and cold have been released to co-operating stations for adaptability trials and final selection. A large number of heat and disease resistant progenies of snap beans apparently adapted to the South are being multiplied for distribution, in 1942. They are also resistant to common bean mosaic. The new Pan American tomato shows promise for the South. It combines the high quality and yield of Marglobe with high resistance to fusarium wilt.

Efforts are being made to develop varieties which are not only productive and pleasant to eat, but also richer in food value and vitamin content. Selections of cabbage with increased vitamin C are being tested and workers in Louisiana have selected sweet potatoes with more vitamin A.

737. ARNY, A. C. *et al.*

575:633(73)

Varietal standardization and registration.

J. Amer. Soc. Agron. 1942 : 34 : 1154-55.

The following crop varieties have been submitted to the committee during the year and have been approved for registration: Santiam barley, Bobshaw cotton, Biwing and Redson flax, De Soto oats, Bridger oats, Cumberland red clover, Midland red clover, Spanish sweetclover, Madrid sweetclover, Evergreen sweetclover, Boone soya bean, Pawnee wheat and Comanche wheat. Descriptions of these varieties will be published later.

738.

575:633(76.2)

633-2.484-1.521.6

Horticultural problems on farms of Mississippi.

Miss. Fm Res. 1942 : 5 : No. 9 : 4-5.

Data are given on the yield, grade, moisture content and storage quality of 49 sweet potato varieties at Laurel in 1941. Triumph is mentioned as having a high yield, being high in starch per acre and medium in percentage starch.

In 1941 six hill selections were made in two domestic potato progenies developed by breeders of the U.S. Department of Agriculture, and planted in 1942. Three new seedlings were selected and in the progenies six hill selections were made. The parents of these selections are disease resistant and it is hoped that locally adapted disease resistant selections may be made. Rutgers was proved a good tomato variety by most of the tests conducted at four different places; Scarlet Dawn is shown to be of use in localities that are not infested with *Fusarium* wilt; Pan American had more resistance to *Fusarium* wilt than any of the standard varieties. This variety has a good colour and flavour but may not withstand transport conditions.

The Mississippi 18 variety of pole bean has a high yield of good quality beans and seems better adapted to Mississippi conditions than most of the other strains tested. It seems to have some resistance to nematodes.

Honey June, the latest variety of sweet corn used in the test, had a poorer yield and quality than the hybrids Aristogold 1, Aristogold 3 and Topflight.

The best of the plum varieties tested were Methley and Satsuma.

The Kosciusko numbers 362, 363 and 364, Red Rowden and Yellow Rowden apple varieties, all Mississippi selections, showed up well in one or more characteristics. Other varieties showing promise are Motto and Carlton.

Of several new pear varieties Waite is the most promising.

A large number of varieties and strains of watermelons are being investigated in an attempt to develop wilt resistant strains of good quality and adaptability to Mississippi conditions. Varieties of tomatoes resistant to *Fusarium* wilt are being selected for more resistance to other diseases, and better quality and yield.

739.

575:633(77.3)

A year's progress in solving farm problems of Illinois 1937-38.

Rep. Ill. Agric. Exp. Sta. 1938 (1942) : Pp. 350.

The following are some items of interest from the Section on Plant Breeding.

Wheat

Illinois 2 which is a variety resistant to mosaic and leaf rust was found to be also resistant to black stem rust.

Oats

A new hybrid strain Illinois 30-2088 gives higher yields than the Columbia variety.

Maize

Selection practised through 41 generations in the variety Burr White has established stable high and low protein strains. Many hybrid varieties were found to be more resistant to insect attack than the commonly grown open-pollinated form.

Barley

Hooded barleys were found to yield less than those without hoods.

Pear

The search for blight resisting pears is being continued.

Peach

Of 645 trees of 1933 crosses all but one bloomed. In these three distinct flower sizes seem to prevail. The data are being prepared for publication.

New Nut and Small-Fruit varieties

Varietal tests are carried on continuously to determine hardiness, adaptation, productiveness and resistance to disease and insects.

Black Raspberry

The new varieties with disease resistance and fruit of good size and quality are showing excellent results.

Gooseberry

New varieties are showing great promise.

Strawberry

New varieties of superior quality and market value, which at the same time are resistant to the root rot brown stele (or red stele) are being developed.

Cabbage and Onion

Disease-resistant strains of cabbage and onion have been tested and the results are tabulated.

Tomato

New "self-topping" varieties were superior in yield to those in which growth was indeterminate.

Bean

The new Illinois Lima bean is well adapted for the freezing process used for marketing. The new Baby Potato lima varieties show good yield and canning quality.

Soya beans

Hybrids combining high yield and early maturity are under trial.

Sweet Corn

Since apparently homozygous inbred lines tend to break up more or less when they are moved from one region to another, the lines must be maintained by some form of selection. Otherwise under continued mass selection various off-types are propagated; and there is also evidence that the line becomes more and more heterozygous, a marked drop in the yields of the hybrid offspring finally resulting.

740.

575:633(82)

CROSS, W. E.

633.61:575(82)

Notas sobre el progreso de la Agricultura y las industrias agropecuarias de Tucumán durante los últimos sesenta años. (Notes on the progress of agriculture and the rural industries in Tucumán during the last 60 years).

Bol. Estac. Agric. Tucumán 1942 : No. 36 : Pp. 75.

A brief outline is given of the activities of the Tucumán Agricultural Experiment Station and

the important role it has played in the development of local agriculture, particularly in the introduction and later production of new mosaic resistant varieties of sugar cane.

741. 575:633(86)

Informe anual de la Estación Agrícola Experimental de Palmira. Junio 10. de 1939, a junio 10. de 1940. (*Annual report of the Palmira Agricultural Experimental Station. 1st June, 1939 to 1st June, 1940*). Mem. Minist. Econ. Nac. Bogotá 1940 : 3 : Pp. 171.

Sugar cane

Pollen of *Saccharum spontaneum* of Amu-Darya in Turkestan, brought by E. W. Brandes from Washington, was used to pollinate the local sugar cane and the variety POJ 2725, some 1,600 seedlings being obtained. Crosses were also made between POJ varieties and certain local Colombian canes. The seedlings have almost all developed well, and tabulated data regarding their characters are presented. The F_1 plants when they flowered were crossed with POJ 2725 or POJ 2878; 88 such back-crosses were made in 1939. Half the F_2 seed has been germinated locally and half sent to Washington, where similar germination results were obtained; these are reported. Some 5,300 F_2 seedlings have been planted out and those with inferior development or mosaic infection have been discarded.

Further pollinations of POJ 2725 were made with pollen of another and better *S. spontaneum* form from Turkestan, U.S. 4515, and part of the seeds also sent to Washington. The seedlings are all exceedingly vigorous.

Observations have been made on varietal differences in reaction to mosaic and various fungous diseases.

A report is also furnished of work done in the Canal Zone by the U.S. Department of Agriculture in collaboration with the Palmira station. Kassoer and various forms of *S. spontaneum* were crossed with cultivated cane varieties. Great hopes are entertained of getting hardier canes by crossing with US 4513 and US 4515, both 60 chromosome seedlings of *S. spontaneum* from Turkestan. The plan for further crossing is outlined.

Rice

Selections have been made on the basis of yield and grain quality, and observations have been made on a collection of 17 varieties, grouped into early, medium and late maturing; consideration has been given to yield, quality and resistance to pests and diseases. Only six of the varieties are being retained. Hybridization work is also being started.

Fruit Trees

Comparative observations have been made on a number of orange varieties. Selection among the local varieties has resulted in notable improvements of quality and one selection has over 38% of seedless fruits. The selections have been tested on a number of different rootstocks. A number of citrus crosses have been carried out with success.

Varietal studies have been made with grapes.

742. 575:633(86)

Informes del Director del Departamento de Agricultura, doctor Eduardo Mejía Vélez. (*Report of Dr E.M. Vélez, Director of the Department of Agriculture*).

Mem. Minist. Econ. Nac. Bogotá 1940 : 2 : Pp. 112.

The work of the Plant Biology section has included studies on the systematics of the Colombian species of palms, *Ficus*, *Gossypium*, *Theobroma* and forage plants.

An account is given of the organization of the Palmira Agricultural Experimental Station. Sugar cane genetic work has been started in collaboration with the U.S. Department of Agriculture. Crosses have been made between local and imported canes and selected canes have been distributed to planters.

Rice crosses and selections have been made with the object of obtaining varieties resistant to disease, free from shedding and superior in yield and quality.

Information is given regarding varieties of wheat, potatoes and cotton.

743.

575:633(92)

Verslag over het jaar 1939 van Het Algemeen Landbouw Syndicaat— Het Zuid- en West-Sumatra Syndicaat—De Centrale Vereeniging tot beheer van Proefstations voor de Overjarige Cultures in Nederlandsch-Indië en van de onder deze Organisaties ressorteerende Vereenigingen en Instellingen. (Report for the year 1939 of the General Agriculture Syndicate—The South and West Sumatra Syndicate—The Central Association for the Management of Experiment Stations for Perennial Crops in the Netherlands Indies and of the Associations and Institutes under the jurisdiction of these Organizations).
Batavia 1939 : Pp. 249.

Rubber

West Java Experiment Station.

Buitenzorg and South and West Sumatra Division.

The results on the identification of rubber clones have been published (cf. "Plant Breeding Abstracts", Vol. XI, p. 144).

Dr Dijkman undertook a study of native rubber in Borneo. The processes of fermentation and preparation as factors in the improvement of tea quality were investigated.

Buddings of 3 rubber clones were made from a mother tree and from the 4th transplantation and it appeared that continued transplantation was rather an advantage than otherwise. Experiments on rubber cuttings—especially of buddings—do not so far seem very promising. The cytological study of *Hevea* is being continued with root tips from illegitimate seedlings of various clones and flowers from about 10 clones. In the resting nucleus the chromosomes as prochromosomes are scattered over the nuclear membrane.

The mutual influence between scion and stock was studied. The growth and productivity of buddings can be increased by using vigorous and productive stocks.

The effect of the scion on the productivity of the stock is specific for each clone.

Most of the older legitimate seedling families involving various Tjir hybrids and PR and BD crosses showed a further increase in yield. Susceptibility to wind damage and brown bast increased very little but differed very considerably in the various families.

In 1939 some artificial pollinations were again made. The family PR 103 (BR 2) x AV 50 has been recommended to planters as a high yielder.

Further results from the Tjiomas plantation (cf. "Plant Breeding Abstracts", Vol. IX, Abst. 1583) showed most of the clones had given still better yields. Among the younger plantings clones AV 186, Limburg I, PB 86, Sabrang 24, WR 101 and some second generation clones seemed promising.

The use of bamboo for cup supports is recommended for clones whose bark is susceptible to canker.

The effects of regular tapping and of spacing and thinning are considered as regards their influence on yield.

Investigations since 1936 have shown that tapping has an inhibiting effect on the growth of seedlings, as determined by the stem circumference.

Rubber Research Division.

The work of the Rubber Research Division included, in addition to physical, chemical and other technical studies of latex and rubber, a general study of latex and rubber to find out possible useful characters that would provide a basis for selection for quality. Samples from about 200 clones were examined for swelling capacity. Some very plastic rubbers were also discovered.

Central and East Java Experiment Station.

Observations on the growth capacity of rubber stocks and the interaction between scion and stock were continued in Malang. In the same area various pollinations were carried out, particularly with Gondang Tapen I. Owing to degeneration of the staminate flowers of this clone it could only be used as the ♀ parent. The percentage success was from 1.5 to 19.

In connexion with records of the time the various experimental clones come into tap, some new experimental plantations of buddings and of seedlings were planned.

Growth hormone treatment of *Hevea* stumps was studied.

Besoeki Experiment Station.

The problems of suitable rubber stocks are being investigated.

At Kaliwining 37,000 crosses of the most recent clones of recognized value were made by artificial pollination, the material being mainly used to test the merits of spacing in rows or squares.

The seedling families PR and LMOD maintained their reputation.

A number of new hybrid families, 3-4 years old, were brought into tap to obtain early information about their yielding capacity and to compare their yielding capacity at an early and at a later stage in the life of the trees.

Twin seedlings appear to be very sensitive to sunburn.

It is thought unlikely that white root fungus can be controlled by using resistant stocks of *Hevea* (or other rubber bearing plants), as the resistance of such stocks appears to be only temporary and the chances of finding an immune variety or clone must be few, in view of the slight degree of specialization of the root fungus and its wide range of hosts.

Measurements in experimental plantations of *Hevea* showed that Avros 49, 188 and 352, PR 2, LMOD 57, Prang Besar 25, Prang Besar 186, Tjir XVI, Tjir I and Pilm. D. 84 are the quickest growers, while BD 5, PR 5, Avros 50 and Sabrang 24 were very slow growers.

The correlation between productivity of young and old rubber trees is being studied and, though little is yet known on the subject, it seems certain that the later tapping of young trees begins, the higher is the correlation coefficient. It also seems as though this correlation coefficient is higher in the case of legitimate seedlings than for illegitimate ones ("sapoe" seedlings).

Work on spacing and mixed plantings (e.g. rubber with coffee) was continued.

Malang Agricultural Association.

The best rubber clones and seedlings (from artificial hybridizations) are specified.

Coffee**Central and East Java Experiment Station.**

The seed gathered from the numerous species of coffee collected in Central Africa germinated well and should prove valuable for work on improvement. Cytological investigation should be of great assistance in determining the suitability of species crosses.

I. Anatomical and physiological research. Work on lateral scions and rooting of coffee cuttings was carried out.

Following cytological studies of the robusta clones, a similar analysis of the available Conuga numbers was begun.

As might be expected from the normal vegetative behaviour of the clones few or no aberrations such as unattached chromosomes, trivalents or tetravalents are found. The means of ring chromosome pairs were between 5.30 and 7.55, which may be regarded as constant for the clones. No reliable differences were, however, found between the individual clones. Robusta SA clones, BP 42, Conuga clones besides varieties such as Excelsa, Liberica, Uganda, Congensis and the cross Con. SA 36 x BP 42 fall within the means, while BP 42 x Kapakata 3 (with 5.13) QP hybrid (with 4.38) and Kapakata (with 8.02) fall outside these limits.

A similar study of diakinesis in two Arabica forms and later of a number of Arabica hybrids showed: Arabica Santos which is regarded as a pretty pure arabica had 13.30 as the average number of ring shaped pairs; Arabica Pasoemah, a less pure type, had 12.74; and the 3 Arla hybrids—Arla 1, 6 and 16—showed respectively 8.68, 7.68 and 9.27. Considering then the number of unattached chromosomes per 100 diakinenses, Arabica Santos (considered one of the purer Arabicas) appears to exhibit few, Arabica Pasoemah more, and the Arla hybrids considerable numbers. The question of whether the loose chromosomes were derived mainly from the ring formations or from the open pairs was examined and some evidence of a correlation appeared to exist between the increased incidence of open chromosome pairs and a reduction in the number of free chromosomes.

An F_1 with relatively few open pairs in conjunction with few loose chromosomes may be taken as an indication of a much better chance of a high percentage of good pollen and normal egg cells.

Breeding practice has already shown that the linkage of the genomes in a coffee cross is very loose and a back-cross of the F_1 hybrids to one parent or selfing results frequently in an F_2 which appears completely, or to a great extent, identical with the original parents.

In practical breeding therefore large scale crosses could be made between Arabica and diploid forms and the 33-chromosome forms could be rejected in the seed bed on the basis of chromosome determinations on the root tips. Subsequent cytological examination of the remaining 44-chromosome hybrids should indicate the number of loose chromosomes and the tendency to have many or few reduction divisions in the flower buds, where a strong tendency to synapsis is present, from which the chance of satisfactory productivity can be deduced. Further particulars about the technique and results were to be published in the "Koffiearchief".

Observations are still in progress on fruit setting in Kawisari B. It seems unlikely that the superior production (fewer spongy beans) of this clone on the Kawisari estate is due, as has been supposed, to some of the stocks having been grafted or being stumped with Conuga clones supposed to ensure more effective pollination. Since diploid Conuga has 22 chromosomes, and Kawisari 44, this view cannot be reconciled with the view that for good endosperm development the pollen parents must be the higher chromosome forms.

Examination of a number of endosperms from trees that developed normally showed that selfing or, in a few cases, possibly doubling of the pollen chromosomes must have occurred. In this connexion some controlled pollinations with Conuga, Arabica and Kawisari pollen were made at Kawisari.

The study of the occurrence of the tendency to round bean formation in various Conuga clones was extended.

Samples of the clones Bgn 6, Bgn 161 and SA 36 were collected during flowering at Bangelan and ultimately seasonal differences in flowering time were recorded.

The work with colchicine was continued (cf. "Plant Breeding Abstracts", Vol. XI, Abst. 315). The germination of seed from BP 42 and Con. SA 36 x BP 42 in colchicine-solutions gave one partial chimaera (a mixture of diploid and tetraploid tissue) and also a few plants that appear to be morphologically aberrant specimens.

Colchicine treatment of young shoots, main stem suckers and flower buds of different numbers and varieties resulted in merely temporary deformities. The effects of colchicine on seedlings at the "Kepellan" stages still remain to be elucidated.

The importing and testing of new varieties for seed—including the wild coffees and cultivated Arabica forms that Dr Ris Lambers brought back from East and Central Africa was continued and ultimately 2700 plants were obtained. Only one consignment from Kenya showed unsatisfactory germination.

Attention was given to a search for mother trees and the testing of their sexual and asexual progeny. About 100 mother trees, good yielders, and often large beamed legitimate crosses recently selected on Soember Asin were chosen for testing at Soember Asin, where also a new series of mother trees have been chosen from superior families for graft.

Testing of clones for their value as lateral scions is proceeding and a number of clones from the cross Con. SA 36 x BP 42 and its reciprocal seem promising.

Selection of Excelsa coffee was begun in Central Java.

Some new crosses have been made, BP 42 and SA 34 being used as the pollen parent in one lot, and TP 21, BP 42 and SA 34 as the mother clones in another lot.

The seedlings from the 1938 crosses at Soember Asin which included species crosses (e.g. with Arabica, Excelsa and Eugeniodes) were planted.

Some of the older hybrids at Soember Asin comprise combinations that nearly equal some of the older high grade buddings in yield and among the newer combinations are some that surpass these buddings in their first year of production. Hybrids involving BP 42 and SA 34 are mentioned as outstanding.

A study was made of vegetative characteristics and the way to identify clones.

Conuga appears to be less susceptible to top die-back than Robusta. This year Excelsa did not appear more susceptible than Robusta. SA 56 again showed very marked susceptibility. Among the best scion/stock combinations listed for comparison of eel worm resistance were SA 13/Can. Mad 3, Con. SA 36/Bgn. 124-01, and SA 13/SA 109. Trials were made on the effect of various stock/scion combinations on yield and eel worm resistance.

The various clones and seedlings planted during 1939-40 for trials are enumerated together with details of the performance of numerous other clones and seedlings.

The chemical aspect of coffee manufacture and its technique have been studied. No correlation was found between the iron content and the colour of the market product.

Besoeki Experiment Station.

The Java hybrids (Java crossed by Conuga and Robusta), are to be used in an attempt to improve the flavour, with due attention to the importance of suitable stocks.

Some selected Arabica coffees brought from Africa by Dr van der Veen and others imported by Dr Hille Ris Lambers were acquired by the Station, as well as some Arabica plants from Kenya, selected by a planter on the spot. The importance of such additional material for breeding purposes is stressed. The value of personal contacts and co-operation and study tours through which such valuable additions are acquired is evident.

Germination of deteriorating stored seed can be increased by 30% by two 24 hour treatments with 3-indole-acetic-acid.

Three-year experiments on 9 estates showed that a large crop gives a smaller bean and late flowering also does so.

The problem of suitable stocks for Java hybrids received special attention.

Crosses were made between high yielding, narrow leaved Robusta clones with large beans that tend to form fair shoots after topping. One parent also regularly tends to form lateral (whip shoots) on the full grown flowering branches (dompolans). It is hoped these desirable features may be ultimately combined in one line or clone.

The study of Robusta and other varieties was continued with some additional new mother trees obtained from crosses.

In connexion with the control of *Pseudococcus citri* Risso the planting of seedless and non-flowering (or practically non-flowering) *Leucaena glauca* x *L. glabrata* and *L. pulverulenta* instead of *L. glauca* has given very satisfactory results.

The performance of various clones and seedlings is recorded. BP 42 and BP 39 are still among the best.

Second and third generation clones of the Java hybrids were ready to be selected for comparison with seedlings.

Arabica coffee selection was concerned mainly with the comparison of *C. arabica* from Abyssinia with the ordinary Java coffee of the Netherlands East Indies.

The former invariably were the better yielders, but their quality was scarcely as good as that of the Java.

Some of the African material recently imported has been planted for experimental purposes.

Malang Agricultural Association.

The problem of eliminating the decrease in yield due to degeneration ("aftakelen") in old trees has already been attacked by selection.

Cinchona*West Java Experiment Station.**Buitenzorg and South and West Sumatra Division.*

Anatomical and physiological research on this crop were conducted.

The periodic changes in the amounts of the different alkaloids present in the bark of a cinchona tree were studied in the bark of succirubra roots of Ledgeriana grafts in relation to the composition of the aerial bark. An extensive study was also made of the validity of the bark tables evolved by the Station for the main Ledgeriana clones and seedlings in different localities.

In connexion with work on cinchona pollination and heterostyly an experiment was begun to find out how far seed production on a large scale could be attained by artificial pollination and complete success resulted, about 2 kg. of seed being harvested from the pollination of 588,000 flowers of Tjibeureum 5 with pollen from clone Goenoeng Agoeng 22—two very productive clones. The 2 kg. yielded about 0.9 kg. of picked seed (about 2,000,000 seeds). The advantages of such advances in technique which enable the breeder rapidly to obtain legitimate seed from new clones are obvious.

Data on the yields of Ledgeriana clones and seedlings were collected. Yields were recorded for 76 new clones tested at Tjinjiroean.

In the experiments in artificial pollination a large number of insects that took part in the pollination were captured to form an insect collection.

Experiments were also conducted on the assessment of the amount of bark and quinine in a plantation.

Work was continued on the technique of the chemical analysis of cinchona bark and the quinine sulphate content of bark and the way it is affected by the drying temperature and some of the results were published.

Tea

West Java Experiment Station.

Buitenzorg and South and West Sumatra Division.

Further anatomical and physiological studies of the tea plant and the leaf in particular were started by Dr de Haan.

As a result of colchicine treatment of tea seeds, seedlings and buds, aberrant forms were obtained which are to be further studied.

Various methods of multiplication (i.e. buddings, stocklings, grafts, division of seedlings) and the use of growth hormones in such processes were investigated.

Artificial pollination experiments showed that both self- and cross-pollination are possible in tea, though with selfing seed formation is much less than with cross-pollination.

Mass selection in the nursery has proved unlikely to be of practical value, as in all cases any excess yield obtained in plantations of trees so chosen very rapidly disappears. Also, no correlation appears to exist between the average stem diameter and height of populations in the nursery and their leaf production.

Clone selection was continued.

The effects of the system of plucking and other cultural factors on production have been studied, as well as the chemical aspects of quality.

The use of *Leucaena pulverulenta* for shade is confronted by the difficulty that it is very susceptible to *Ferrisia virgata* (Ckll.).

Central and East Java Experiment Station.

Two experimental plantations were laid down in the Malang/Kediri district.

Cacao

Central and East Java Experiment Station.

It has been found in the course of pollination that other features of the flowers than the corolla may be of assistance in identifying clones.

The results of artificial self-pollinations in the oldest plantation of buddings at Djatiroenggo (Mj 320) have been published (cf. "Plant Breeding Abstracts", Vol. X, Abst. 513).

Selfing experiments have shown that the clone DR 1 is self-sterile and DR 2, 3, 7, 10, 11, 17, 18, 21, 24, 31 and 42 may all be regarded as self-fertile. Other selfings of the mother trees As 12 to 25 showed that As 13 and 22 to 25 are probably self-sterile and the others self-fertile.

Some cross-pollinations of DR 1X DR 2 were made.

Problems of *Helopeltis* control and drying and fermentation processes were studied.

Leucaena species

Besoeki Experiment Station.

Pseudococcus filamentosus (which attacks the lamtoro and passes from it to coffee growing underneath) was observed on one plantation to have infested the seedless *L. glauca* very severely, while neighbouring non-sterile *L. glauca* were not infested.

New lamtoro varieties have continued to be the subject of investigation (cf. "Plant Breeding Abstracts", Vol. XI, Abst. 315). Flowering and non-flowering trees of *L. pulverulenta* were observed adjacent in the plantation and one of the flowering trees seemed to differ in its habit and other respects too. *L. pulverulenta* probably comprises several varieties; and in a 1939 plantation grown from Djember seed about half the trees were apparently intermediate forms which are assumed to represent the F₁ from an *L. pulverulenta* x *L. glauca* cross. The merits of this new type and of a new *L. glabrata* x *L. glauca* hybrid are being examined and buddings are being distributed to the estates (cf. "Plant Breeding Abstracts", Vol. X, Abst. 1110, and Vol. XI, Absts 478 and 479).

Malang Agricultural Association.

Work on a suitable substitute for *Leucaena glauca* as a shade tree was in progress.

Miscellaneous

Besoeki Experiment Station.

Among the other plants imported from Africa were the shade trees—*Sesbania* sp., *Crotalaria agathifolia*, *Lupinus varius*, *L. odoratissimus*, *Tetrapteria tetrapleura*, the last named being a very slow growing shade tree that can grow on acid soil where lamtoro, *Albizia* and dadap fail.

Oil palm, *Derris* and cacao and *Aleurites montana* are also included in the research programme, *Derris* being reported as a new crop in some Malang localities.

Malang Agricultural Association.

Coca grown in Java was in demand owing to depleted European stocks.

744. S—N, N. 575:633:007(48.5)
Professor H. Nilsson-Ehle 70 år. (Professor H. Nilsson-Ehle—70th
birthday).

Svensk PappTidn. 1943 : 46 : p. 45.

A short eulogy of Nilsson-Ehle and his achievements in genetics and the promotion of genetical research and the foundation of an institute in Sweden for the improvement of fruit and forest trees.

745. CRAWFORD, M. D. C. 575:633:576.12
Art of the ancients. A panorama of cotton and other textiles from
earliest days.

J. N. Y. Bot. Gdn 1942 : 43 : 285-93.

The writer at the beginning of his paper on the history of the textile development of cotton, remarks that we have not produced a single useful species of plant or animal, since all the economic types come from some earlier age.

746. HAZEL, L. N. and 575:633:578.08
LUSH, J. L.

The efficiency of three methods of selection.

J. Hered. 1942 : 33 : 393-99.

The author (who is on the staff of the Bureau of Animal Husbandry, Idaho) discusses the relative merits of the tandem method, the "total score" method and the method of "independent culling levels" in selective breeding of animals or plants. The "total score" method is regarded as the most efficient and the "tandem" method the least so.

747. ROEMER, T. 575:633:578.08(43)
Entwicklungslien der Züchtungsmethoden. Erweiterter Vortrag bei
der Tagung des Reichsverbandes deutscher Pflanzenzuchtbetriebe in Wien,
26. Juni 1939. (Development of breeding methods. Extended lecture
at the meeting of the State Association of German plant breeding
concerns in Vienna on 26th June, 1939).

Kühn-Arch. 54 : 267-94.

After having referred to pioneer work in plant breeding carried out in Vienna by Fruhwirt by his clear definition of basic principles, Roemer proceeds somewhat to modify them, so as to bring them into better conformity with the modern principles of plant breeding, theory and practice. The mode of reproduction is for Roemer the real basis of his system. Von Rümker's contributions in the development of the terminology of plant breeding are stressed.

With cogent, exhaustive examples from plant breeding theory and practice, presented in a critical and original manner, the author groups the various methods as follows: In self fertilized plants he distinguishes I. Breeding by selection -with the sub-groups (1) Separation of different forms; (2) Plus- and minus- selections; (3) "Erhaltungszucht" (removal of forms arising from (a) Inbreeding, (b) Mutation and (c) Mechanical mixture). II. Cross-breeding: the sub-groups are (1) Individual combination; (2) Transgression breeding; (3) Back-crossing; (4) Repeated combination; (5) Heterosis breeding.

In cross-fertilized plants breeding is based on (1) the extent to which the breeder interferes in the fertilization processes; (2) the degree of relationship between the individuals or strains crossed.

Five main groups of methods are distinguished: A. Completely free pollination; B. Control of fertilization by cultural measures (with or without isolation in the open); C. Control of fertilization by artificial hybridization (by crossing of particular individuals, family crossing, inbreeding, pure self-fertilization); D. Controlled group crossing (here the method of diallel crossing is mentioned); E. Convergent breeding (alternation between enforced self-fertilization and controlled cross-fertilization). Finally attention is drawn to the future possibilities of breeding by the methods of artificial mutation with X-rays, etc., and by polyploidy.

Roemer emphasises strongly the need for the increasing application of allied sciences such as genetics, cytology, biology of reproduction, statistics, plant physiology, chemistry, etc. He

demands as an essential qualification of the competent breeder a thorough biological training for which a "Beratung des Züchters"—that is a purely practical system in which the breeder occasionally consults the representatives of different sciences—is no substitute whatever. The possibilities of transgression breeding are strongly emphasized, also the principle of successive combinations. The merits of the back-cross method are fully illustrated by the example of the breeding of *Tilletia* resistant wheat varieties in Halle Saale. K. F.

748. YARNELL, S. H. 575:633:581.02
Influence of the environment on the expression of hereditary factors in relation to plant breeding.
Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 398-411; also Science 1942 : 96 : 505-08.

The author reviews the work of many investigators who have shown the effect of the environmental factors moisture, temperature, light, nutrition and many geographic and cultural conditions, on mendelian factors. It has been shown that appropriate environmental conditions must be present before any gene or gene combinations can have a selective value, either natural or in plant breeding, and that genes of value in one area may be lost by breeding elsewhere. Improvement might be expected in some cases by intervarietal crosses by accumulating genes from different varieties that may have a favourable effect directly or in combination and in other cases by out crossing to available wild forms or making wide crosses among cultivated forms.

Much of the breeding work in the south and south-west is in line with these considerations. The U.S. Regional Vegetable Breeding Laboratory sends out segregating strains of vegetables to permit selection of the most favourable genetic combinations for the varying local conditions. Other examples of this type of work are given.

The author points out that the discovery of new genes should be made and that these genes should be judged by what they can do under local conditions, both as individual hereditary factors and in new combinations.

GENETICS 575.1

749. REITZ, L. P. *et al.* 575.113:001.4:633.11
Nomenclature of genetic factors in wheat.
J. Amer. Soc. Agron. 1942 : 34 : p. 1154.

A committee was appointed in June, 1941, to develop a uniform system of nomenclature. The committee is considering a system in which the symbol consists of the initial letter of the name of the character or the initial letter of some other appropriate word in the name along with the alphabetical and numerical subscripts to designate different gene symbols for a character. The committee hopes to present a complete summary and its recommendations at the next general meeting.

750. AVERY, A. G. and 575.243:581.01
BLAKESLEE, A. F.
Mutation rate in *Datura* seed which had been buried 39 years.
Genetics 1943 : 28 : 69-70 (Abst.).

The mutation rate was distinctly higher than that in the standard lines but much lower than in seed stored under laboratory conditions.

751. ALLEN, C. E. 575.76:576.311
Regeneration, development and genotype.
Amer. Nat. 1942 : 76 : 227-38.

In this paper, one from a symposium on "Growth and differentiation in plants", the author discusses the genotype, its potentialities and limitations in regeneration and development. While the germ cell can reproduce the complete genotype, somatic cells vary considerably in their capacity to reproduce even cells like themselves. A review of some of the outstanding facts of regeneration, from the formation of the complete genotype from one somatic cell to cells incapable of division leads to the suggestion that the cytoplasm may play an important part in determining the capacity of the nucleus. R. M. I.

ORIGIN OF SPECIES 576.1

752. STEBBINS, G. L. (jun.) 576.12:575.24

The role of isolation in the differentiation of plant species.
Biol. Symp. 1942 : 6 : 217-33.

Many plant species are instanced to show that geographical isolation, even over millions of years, does not necessarily lead to cross-incompatibility or sterility, and that the degree to which species or races differ morphologically is no criterion of their degree of intersterility. Genetic isolation is thought to have evolved by the gradual accumulation of small differences. Recombinations of these may occasionally result in the sudden production of a new species.

753 HIESEY, W. M., 576.16:581.056:575
CLAUSEN, J. and
KECK, D. D.
Relations between climate and intraspecific variation in plants.
Amer. Nat. 1942 : 76 : 5-22.

Experimental studies are described whose object is to elucidate the relation of plants to each other and their relationship to the environment. Plants grown in various different climatic environments showed that the ecotypes are best adapted to their own environment but that they differ in their degree of tolerance to new surroundings. Inter-ecotype crosses were made in the perennial *Potentilla glandulosa*. An alpine form was crossed with a type from the foothills; the F_1 was intermediate and there was marked segregation in the F_2 and some F_3 plants show a wider range of adaptability than that of the parents, which suggests the possibility that new ecotypes may arise by crossing.

R. M. I.

754. ELIAS, M. K. 576.16:585.421
Structure of grass and its evolution.
Amer. J. Bot. Suppl. 1942 : 29 : 7s-8s.

Palaeontological evidence is discussed. The writer maintains that "because lemma and vegetative leaf in modern grasses are adapted correspondingly to functions of flower protection and seed dispersal, and of assimilation, their differences apparently increased with increase of adaptation". The leaf of the ancestral forms would probably be less specialized.

CYTOLOGY 576.3

755. SEIFRIZ, W. 576.312.381:576.34:576.311
Protoplasmic streaming. 581.331.23:576.311
Bot. Rev. 1943 : 9 : 49-123.

This full survey of the subject touches on the problem of the cause of the movement of chromosomes and on the possible role played by protoplasmic streaming in certain processes in reproduction such as the transport of the male nucleus down the pollen tube from pollen grain to ovule and cell division.

756. GAVAUDAN, P. 576.35:581.04
Action sur la caryocinèse, la cytodièse et la croissance végétales des hydrocarbures cycliques a deux noyaux benzéniques sans atomes de carbone communs et des dérivés nitrés et méthylés du benzène, du naphthalène et de l'acénaphthène. (Action on nuclear and cell division and on growth in plants of the cyclic hydrocarbons with two benzene rings without common atoms of carbon and of nitro and methyl derivatives of benzene, of naphthalene and acenaphthene).
C.R. Soc. Biol., Paris 1942 : 136 : 383-84.

GAVAUDAN, P.
Essai d'explication du mécanisme de rotation de l'axe de caryocinèse et du plan de cytodièse dans la cellule végétale soumise a l'action des substances modifiantes de la caryocinèse. (Attempt to explain the mechanism of rotation of the axis of nuclear division and of the plane of cell division in the plant cell under the action of substances modifying nuclear division).
Ibid 1942 : 136 : 419-20.

In the first paper, the author mentions a number of substances with two benzene rings which affect cell division to a greater or lesser extent.

In the second paper the action of certain substances on the orientation of the cortical cells of the root meristem of *Triticum vulgare* is briefly noted. R. M. I.

757. EIGSTI, O. J. 576.353:576.356.5:578.08
A comparative study of mitosis in diploid and tetraploid species.
Amer. J. Bot. Suppl. 1942 : 29 : p. 7s.

A study of division of the generative cell of *Polygonatum biflorum* ($2n = 20$) and *P. canaliculatum* ($2n = 40$) showed an accelerated mitosis rate in the diploid. The method used for determining mitotic activity should, it is suggested, be of value in further comparative work with diploid and tetraploid material.

758. BERGER, C. A. and 576.354.46:576.312.38:635.41
WITKUS, E. R.
A possible source of new evidence on the difference between mitosis and meiosis.
Genetics 1943 : 28 : p. 70. (Abst.).

In root tips of spinach, polyploid cells arise by each chromosome reproducing itself twice during the resting stage. In the first ensuing division pairing and relational coiling are observed but in all subsequent divisions no pairing occurs. A comparison is to be made between polysomatic pairing and meiotic pairing.

759. BEAL, J. M. 576.356
Induced chromosomal changes and their significance in growth and development.
Amer. Nat. 1942 : 76 : 239-52.

This paper, from a symposium on "Growth and differentiation in plants", reviews the various ways by which chromosomal changes may be induced, including X-rays, temperature changes, various chemicals and polyploidy and discusses briefly their value to the plant—in the part they play in species formation. R. M. I.

760. MARINELLI, L. D., 576.356:537.531:578.08
NEBEL, B. R.,
GILES, N. and
CHARLES, D. R.
Chromosomal effects of low X-ray doses on five-day *Tradescantia* microspores.
Amer. J. Bot. 1942 : 29 : 866-74.

A mathematical interpretation of quantitative data on the action of X-rays on chromosomes as recorded with standard material and equipment. The authors found that their data and Sax's recent observations could be satisfactorily interpreted on the basis of the theory of the type of recovery postulated by Swann and Del Rosario in their work on *Euglena*, namely—that the probability of a single chromosome break healing in the next unit time is a constant λ independent of X-ray dose and of irradiation time.

The interpretation is at present regarded as valid only for low doses.

761. SAX, K. 576.356:537.531:581.039
The effect of centrifuging upon the production of X-ray induced chromosomal aberrations.
Proc. Nat. Acad. Sci. Wash. 1943 : 29 : 18-21.

Inflorescences of *Tradescantia* were subjected simultaneously to X-ray irradiation and centrifuging. The combined treatment produced a marked increase in chromatid aberrations as compared with controls X-rayed alone or centrifuged only after irradiation. It is thought that stresses induced in the chromosomes at the time of breakage would separate the broken ends of chromosomes severed by the X-rays and thus promote illegitimate associations.

762. LEVINE, M. 576.356:537.531:581.04
The effects of X-rays on "colchicine tumors" on the root tips of the common onion.

Amer. J. Bot. Suppl. 1942 : 29 : p. 13s. (Abst.).

LEVINE, M. and
 GELBER, S.

The metaphase stage in colchicinized onion root-tips.

Bull. Torrey Bot. Cl. 1943 : 70 : 175-81.

As recorded in the first paper examination of roots of *Allium Cepa* (var. Yellow Globe and var. Brigham Yellow Globe) treated with X-rays after immersion in a colchicine solution showed that the ability of the cells to divide had been permanently impaired, the injury affecting not only metaphase, but the resting stage also.

Possible bearings on cancer research are suggested.

The second paper reports a subsequent experiment to determine at what time after treatment onion roots that had been treated with colchicine showed the largest number of dividing cells in metaphase.

763. SWANSON, C. P. and 576.356:575.11:635.72
 NELSON, R.

Spindle abnormalities in *Mentha*.

Bot. Gaz. 1942 : 104 : 273-80.

The authors contribute to the general study of cell division—a highly complex and delicately balanced process—the results of their investigation of a genetically controlled aberration in the development and behaviour of the spindle in *Mentha* species.

The plants examined were clonal lines of *M. piperita* L. var. Mitcham (which is usually regarded as a hybrid, with *M. spicata* and *M. aquatica* as its probable parents), *M. spicata* L. (Huds.) var. *crispata* and six of their interspecific hybrids.

Genetic control of spindle development is discussed in general, as well as the particular structural and time variations observed in the *Mentha* material, in which the abnormalities are attributed to the action of a partially dominant gene transmitted from *M. spicata* to all its offspring. This gene induces an instability of spindle form and behaviour which is subject to environmental differences. The gene exerts no precise directive influence on the actual type of spindle aberration.

The bearing of the authors' findings on the postulate of polar repulsions (referred to by Darlington and Koller) in the study of cell mechanics is indicated.

764. MÜNTZING, A. 576.356.5:575:633
 Experimentella kromosomtalsförändringar och deras betydelse för växtfördelningen. (Experimental chromosome number alterations and their importance for plant breeding).

K. LantbrAkad. Tidskr. 1942 : 81 : 97-114.

A review of the results achieved in plant breeding by means of polyploidy especially since the discovery of the value of colchicine for the purpose, shows that while polyploidy in itself is by no means the solution of all the problems of the plant breeders, it can be made to yield valuable results.

Potatoes and flax are two outstanding cases in which the doubling of the chromosomes has led to decreased vitality and fertility.

Certain tetraploid barleys though not yielding as well as the diploid and with a poorer germination capacity have a higher 1,000 grain weight and a very high protein content. Crossing and selection should lead to further improvements.

With regard to wheat-rye hybrids, the present types are an improvement on the old but if they will prove to be of economic value remains still an open question. Tetraploid sugar beets have about the same weight and sugar content as the diploids. They are fertile, crossing readily with diploids and the triploids have been shown to have a considerably higher sugar content than diploids. Polyploid timothy with 63 and 56 chromosomes has shown the possibility of combining high yield with high fertility. Work is in progress on clover species and is most advanced in red clover. Tetraploids have been produced from the varieties Merkur, Wambasa, Offer and Ultuna as well as from crosses. In comparative tests, though the tetraploids have a somewhat lower dry matter content, the dry weight per plant is considerably higher than that

of the diploids. Though the fertility is low if the plants are left to themselves, 100% set is obtained with artificial pollination and pollination by insects. The results for alsike and white clover are still inconclusive.

R. M. I.

765. EIGSTI, O. J. and

SCHNELL, L.

576.356.5:581.04:578.08

A comparison of colchicine treatment with a glycerine base and a water base.

Genetics 1943 : 28 : p. 73. (Abst.).

Approximately 5% of the plants treated with colchicine-in-glycerine became tetraploid, whereas less than 1% tetraploidy resulted in those treated with colchicine-in-water. The glycerine method also gave a higher proportion of chimaeras and a slightly lower mortality.

766. EIGSTI, O. J. and

TENNEY, B.

576.356.5:581.04:578.08

Range of concentrations and number of applications of colchicine effective for the induction of polyploidy in *Vinca rosea*.

Genetics 1943 : 28 : 73-74. (Abst.).

The results show that five applications of 1% colchicine in a glycerine base is the most effective; also that, within the limits of the series used, the concentration of the colchicine preparation and not the number of treatments is the most important factor in inducing polyploidy in seedlings of *Vinca rosea*.

767. THOMPSON, R. C.

576.356.5:581.04:578.08

A technique for treating small seedlings with colchicine.

Plant Physiol. 1943 : 18 : 128-30.

By the method in question the growing apex of the seedlings (of *Lactuca* in the instance cited) can be treated with colchicine without subjecting the radicle and rootlets to the deleterious effect of the chemical. Large numbers of seedlings can be treated with relatively little labour. The seedlings must, however, have long hypocotyls—a condition which can be induced by placing the germinating seeds in darkness on a moist surface at a temperature of 25°-30° C. at the time when the radicles appear through the seed coats.

The simple apparatus required consists essentially of a Petri dish with a waxed partition dividing the inside into two halves, one of which contains wet cotton on which the roots of the seedlings lie, and the other colchicine solution in which the epicotyls are immersed.

Because of their long hypocotyls the seedlings must be planted deeper than usual in the soil. Tetraploid stems on diploid roots obtained by the procedure outlined have been far more satisfactory than the types of tissues obtained by other methods so far tried.

768. STEBBINS, G. L. (jun.)

576.356.5:581.5

Polyploid complexes in relation to ecology and the history of floras.

Amer. Nat. 1942 : 76 : 36-45.

It is suggested that polyploids as younger members of a species have the chance to adapt themselves to land of later origin than that available to their more primitive diploid progenitors and that by a study of their distribution problems as to the origin and history of floras may be elucidated. In illustration of the theory details are given of the cytology and distribution of *Eriogonum fasciculatum* Benth. in California. The two tetraploids, *typicum* and *polifolium* occupy definite districts. The distribution of the octoploid form *foliolosum* suggests that it was able to adapt itself to territory newly available at the end of the Pliocene and the early part of the Pleistocene epochs.

R. M. I.

EXPERIMENTAL TECHNIQUE 578.08

769. PROSKURJAKOV, N. I. and

KOŽEVNIKOVA, A. N.

578.08:581.192:633.491

(A direct method of determining starch in plant material).

Biohimija 1940 : 5 : 624-29.

A description is given of a modification of Chinoy's method of starch determination devised by the authors and used in estimations of potato and particularly wheat starches. It is supposed that this more rapid and simpler technique could also be adapted for leaves, fruits and other plant organs.

BOTANY 58

770. MURPHY, J. B. 581.142:538:576.3

The influence of magnetic fields on seed germination.

Amer. J. Bot. Suppl. 1942 : 29 : p. 15s. (Abst.).

Several species of seeds were used and different types of magnets.

In the majority of cases germination was hastened and the resultant plant was, in several cases, hardier than untreated plants.

Some possible effects of magnetic influence on cell activity were studied.

771. CARTTER, J. L. 581.142:578.08

Equipment for maintaining controlled temperature and low humidity in a seed storage room.

J. Amer. Soc. Agron. 1942 : 34 : 1017-27.

Equipment for maintaining constant low humidity in a laboratory seed storage room is described. This equipment can maintain 16% relative humidity and 70° F. temperature in an insulated room used for the year round storage of soya bean seed.

A unique feature of the equipment is the provision for rapidly and automatically defrosting the cooling coil.

772. PARKER, M. W. and BORTHWICK, H. A. 581.143.26.035.1:633.61:575.127.2

Day length and crop yields.

Misc. Publ. U.S. Dep. Agric. 1942 : No. 507. Pp. 22.

The authors discuss the meaning of photoperiodism and its application to plant breeding. An example is given of a cross between a wild species of sugar cane (*Saccharum spontaneum*), which blooms in July, and cultivated sugar cane (*S. officinale*) which blooms in November or December. By manipulations of photoperiods the times of flowering were synchronized. The blooming period of the hybrids was found to be intermediate between those of the parents. The purpose of the cross was to combine those factors which contributed cold hardiness to the wild species with the factors for yield and quality present in the cultivated sugar cane. A description of methods used is given.

773. RICK, C. M. 581.331.2:575.113:635.656

The genetic nature of X-ray induced changes in pollen.

Proc. Nat. Acad. Sci. Wash. 1942 : 28 : 518-25.

X-ray irradiation induced a significant increase in pollen abortion and a decrease in mean pollen length in diploid *Tradescantia*; there was an increase in variability in length of pollen. Very little effect was observed in tetraploid species.There was evidence that irradiation was more effective at low than at high temperatures. Crosses were made between plants of *Pisum sativum* L. differing in length of pollen grain. The pollen of the F_1 was in every case intermediate; the hybrids were more variable than the parents but in one case at least the hybrid failed to cover the entire range of its parents. It is concluded from these two experiments that size and viability of pollen are at least partly genetically self-determined and dependent on multiple factors.

774. SMITH, A. C. 581.9:576.12

Vegetational zones of northern South America.

Amer. J. Bot. Suppl. 1942 : 29 : p. 17s. (Abst.).

The region considered extends from the Plain of the Amazon and Bolivia northward with an area of ca. 3,500,000 square miles. It is regarded as probable that only three major elements have entered into the composition of the flora of the region. The largest of these is a pantropical element which probably indicates a common ancestry for the flora of South America and Africa. Another element indicates a relationship between the floras of South America and Australia, suggesting an ancient Antarctic connexion.

775. RANZI, F. 582:578.08:069.5

Two processes for preserving small animals, herbarium material, phytopathological specimens, etc.

Int. Rev. Agric. 1942 : 33 : 86M-89M.

Enclosures in resin or in cellophane are the two methods described.

SEED TESTING 631.521.5

776.

631.521.5(73)

633.31-2.111-1.521.6

Testing Lend-Lease seed shipments. USDA going to extreme lengths to see that only quality seed, properly labelled, is sent to Allies.

Seed World 1942 : 52 : No. 12 : 12-13.

Lend-Lease seeds mainly true to variety.

Sth. Seedsman 1942 : 5 : No. 11 : p. 30.

Field variety trials on samples of Lend-Lease seed obtained from all parts of the country were undertaken at Beltsville, Maryland. The results from these tests as well as germination and laboratory tests were used in giving consideration to further purchases made from seedsmen who had delivered off-grade seed and in taking action under the Federal Seed Act. Tests are also being conducted to determine the variety and origin of alfalfa by means of cold resistant tests of the seedlings.

PLANT DISEASES AND PESTS 632

777.

WHITE, O. E.

632.111-1.521.6:575.242:576.16

Temperature reaction, mutation, and geographical distribution in plant groups.

Proc. 8th Amer. Sci. Congr. 1940 : 3 : 287-94.

Tabular evidence is presented to show that within certain families, genera and even species, occasional forms exist which are much more hardy than the average members of the group. The author concludes that such forms could have arisen only through some form of mutation, which has taken place in many systematic units irrespective of their geographical or climatic location. Hence if a sufficiently large number of forms are examined it is likely that hardy types of many tropical or sub-tropical species could be found. Extensive observations made to test the hypothesis have shown many local floras to be mixed as regards hardiness and hence to offer opportunities for selection.

778.

BOWDEN, W. M.

632.111-1.521.6:576.356.5

Chromosome number and winter hardiness relationships in the higher plants.

Proc. Va Acad. Sci. 1940-1941 (1941) : 2 : p. 173.

Mixtures of non-hardy, less hardy and fairly hardy species are found in tropical and sub-tropical floras; while in colder regions there is a higher percentage of cold-resistant species. Variation in degree of hardiness is primarily associated with genic differences but may be secondarily affected by chromosome doubling.

The data obtained did not support the views of Tischler, Hagerup, and Müntzing, that polyploids are usually hardier than diploids and usually occupy the more adverse environments.

779.

TIMM, E. W. and

LINDSTROM, E. W.

632.3:575.242:633.15

Experimental proof of mutation in virulence of the bacterial wilt pathogen of maize.

Genetics 1943 : 28 : p. 94. (Abst.).

Beginning with a single cell of *Phytoponas stewartii* 55 mutants were isolated and stabilized. Tested on a susceptible sweet corn line the mutants showed significant differences in virulence, the majority being less virulent than the parent. Three mutants however were found to be more virulent than the parent, two of them significantly so. The mutants differed also in colony morphology.

780.

BESSEY, E. A.

632.4:576.16

Some problems in fungus phylogeny.

Mycologia 1942 : 34 : 355-79.

The difficulties of judging relationships in the fungi and determining the probable course of evolution are stressed as an introduction to the author's contributions to various specific problems such as the ancestors and allies of the slime moulds, the classification of the Chytridiales and of the Mucorales, Entomophthorales and the higher fungi, the phenomena of sexuality and the identity of the ascomycetes.

781. CLAYTON, E. E. and STEVENSON, J. A. 632.411.4:576.16
Peronospora tabacina Adam, the organism causing blue mold (downy mildew) disease of tobacco.
Phytopathology 1943 : 33 : 101-13.

A detailed investigation of the size of the conidia and conidiophores of *Peronospora tabacina* and of the oospores failed to produce evidence for species determination and neither were any morphological characters found suitable for the purpose.

Only one species, *tabacina* Adam., causing blue mould of tobacco would seem to exist. The distribution and origin of the species are discussed.

R. M. I.

782. BRAUN, H. 632.412.5:576.16:633.491
Biologische Spezialisierung bei *Synchytrium endobioticum* (Schilb.) Pér. (Vorläufige Mitteilung). [Biological specialization in *S. endobioticum* (Schilb.) Pér.—Preliminary communication].
Z. PflKrankh. 1942 : 52 : 481-86.

An account is given of the appearance in Germany of two new biotypes of *Synchytrium endobioticum*, G (discovered in Giessübel in Thuringia) and SB (found in Southern Bohemia). Biotype G is highly virulent to a great many of the potato varieties at present allowed to be cultivated in Germany, though it is possible that Fram and Frühe Hörnchen may prove resistant and the three varieties Edelrot, Hellena and Treff As, judging from tests with 37 others, may also be resistant. Some more possibly resistant varieties have also been identified in trials at the Müncheberg Institute.

Out of 66 varieties on the official German approved list 32 were not infected after injection of SB and among these Fram and Frühe Hörnchen again appeared.

Unfortunately the new biotypes both surpass the old one in virulence. Their incidence may, however, prove to be restricted to very small areas of the country and their occurrence should, having regard to existing potato regulations, be easy to detect, provided no additional physiological forms are found to have arisen.

783. HARDISON, J. R. 632.421.1:576.16:633.1
Pathogenicity of races of *Erysiphe graminis* on grasses in the tribe *Hordeae*.
Phytopathology 1943 : 33 : p. 5. (Abst.).

Infection of species of *Aegilops*, *Agropyron*, *Elymus*, *Sitanion*, *Triticum* and *Hordeum* was caused by *Erysiphe graminis* from wheat and barley. This suggests that wild grasses may serve as sources of primary infection and for the overwintering of races of wheat and barley mildews. Hybridization may also occur.

R. M. I.

784. KEITT, G. W., LANGFORD, M. H. and SHAY, J. R. 632.421.9:575.24
Inheritance of pathogenicity and certain mutant characters in *Venturia inaequalis*.
Phytopathology 1943 : 33 : p. 19. (Abst.).

"Only 2 types of pathogenic reaction have been encountered in monoascosporic lines freshly isolated from naturally occurring perithecia (normal or nonmutant lines), lesion (P) and fleck (p). With normal parental lines and selected host varieties, crosses of lesion x lesion lines uniformly gave 8 lines lesion; fleck x fleck, 8 lines fleck; lesion x fleck, 4 lines lesion, 4 lines fleck. In all adequately studied crosses, factors for lesion (P) and fleck (p) have segregated 1:1, behaving as alleles. An isolate may incite lesion reaction in one variety, fleck on another. Cultural mutant tan (T) x normal (t) gave ascospores containing 4 lines tan, 4 lines normal. All lines carrying tan were non infectious. Cultural double mutant tan-nonconidial (T Nc) x normal (t nc) gave lines of tan, nonconidial, tan-nonconidial, and normal (nontan-conidial), different combinations occurring in different ascospores. Tan and nonconidial, respectively, segregated from their normal alleles 1:1. Lines carrying nonconidial without tan were non-infectious, except on McIntosh, on which they incited flecks instead of the lesion reaction of the line before mutation. Studies of crosses of these mutant lines x normal lines indicate that these mutations have suppressed, but not changed, the factor or factors for pathogenicity".

785. SHAY, J. R. 632.421.9:575.24
Genetic studies of certain mutant characters in *Venturia inaequalis*.
 Phytopathology 1943 : 33 : p. 11. (Abst.).

A study of certain mutants of *Venturia inaequalis* showed that there were three mutants arising as white or pinkish-white sectors in culture that transmit factors for ascospore abortion. Crosses indicate that ascospore abortion and white colour come from the same mutation. The location of the mutants white (W), tan (T) and non-conidial (Nc) and of the sex factor in relation to the centromere is indicated.

R. M. I.

786. DÉFAGO, G. 632.421.9:582
 Seconde contribution à la connaissance des *Valsa*ées von Höhnel. (Second contribution to the study of Höhnel's *Valsa* forms).
 Phytopath. Z. 1942 : 14 : 103-47.

In this contribution to the systematic determination of various *Valsa* species, their different developmental stages and the variations observed in the characteristics of the species according to the particular host plant involved and other environmental factors are dealt with in detail.

787. LINDEGREN, C. C. and 632.422.3:575.14
 LINDEGREN, G. **Legitimate and illegitimate mating in *Saccharomyces cerevisiae*.**
 Genetics 1943 : 28 : p. 81. (Abst.).

No degeneration in spore viability occurred after five generations of inbreeding, where each generation was produced by cross-breeding two gametes from different ascospores, but both ascospores had developed in the same ascus. It is concluded that segregation of different mating type genes occurs in the ascus and that each ascus contains ascospores of different mating types. An illegitimate mating between haploid cells of the same mating type produces a degenerate form, the characteristics of which are enumerated.

788. STAKMAN, E. C., 632.451.2:575.24:575.11:576.16
 KERNKAMP, M. F.,
 KING, T. H. and
 MARTIN, W. J. **Genetic factors of mutability and mutant characters in *Ustilago zea*e.**
 Amer. J. Bot. 1943 : 30 : 37-48.

The extent to which new biotypes of *U. zea*e can arise through mutation and through hybridization has been studied since 1929 and the present paper records detailed results showing that the tendency to mutate is governed by genetic factors and that clearly observable mutant characters persist through the sexual stage.

The tendency to constancy and variability (mutability) can, it is believed, be increased in the desired direction by appropriate breeding of lines of the same kind with respect to these two characters.

The range of variation of nearly all the characters studied, which included sex, mutability and pigmentation, was wide with almost imperceptible intergradations between the extremes—a finding of particular and practical importance as regards pathogenicity. (Cf. "Plant Breeding Abstracts", Vol. VII, Absts 916 and 919).

789. UTTER, L. G. 632.451.2:633.13-1.521.6:575
Studies on experimentally produced physiologic races of the oat smuts.

Phytopathology 1943 : 33 : p. 14. (Abst.).

Data are given on the reactions of a number of races obtained by the hybridization of Race 1 of loose smut and Race 1 of covered smut.

R. M. I.

790. HOLTON, C. S. 632.451.3:575.127.2:633.11
Extent of pathogenicity of hybrids of *Tilletia tritici* and *T. levis*.
 J. Agric. Res. 1942 : 65 : 555-63.

The results from investigations on 50 interspecies and interrace hybrids of *Tilletia tritici* and *T. levis* are presented. Approximately 83% of the interspecies hybrids perpetuated themselves, in contrast to only 59% of the interrace hybrids. On the other hand, the race hybrids were more productive of new pathogenic segregates than the species hybrids.

Some of the segregates from the various hybrids were more virulent than the parent race s., others were less virulent, while still others were similar in pathogenicity to the parent race s. Entirely new combinations of pathogenicity factors were produced in several of the hybrids, as indicated by their pathogenicity on the variety Hussar x Hohenheimer, which is highly resistant to all known naturally occurring races of the wheat bunt fungi.

Pathogenicity in *Tilletia tritici* and *T. levis* is genetically controlled and apparently inherited on a multiple-factor basis. Factors for pathogenicity and spore morphology are inherited independently.

The selective influence of the host variety is important in the establishment of new pathogenic types resulting from hybridization.

Author's summary.

791. SAVULESCU, T. 632.451.3:576.16:633.11(49.8)

Das Vorkommen und die Verbreitung der in Rumänien den Weizenstinkbrand hervorbringenden *Tilletia-Arten*. (The occurrence and the distribution of the *Tilletia* species causing bunt in Rumania).

Phytopath. Z. 1942 : 14 : 148-87.

The distribution of *Tilletia tritici* and *T. foetens* in the United States, Canada and Europe (especially Rumania) is discussed, as well as Gassner's new type *T. tritici forma intermedia* which he believes to be a hybrid of *T. tritici* and *T. foetens* and found in association with those species. Past work on specialization in *Tilletia* is also referred to.

The problem of the identity of the author's discovery, the form *Typus triticoides* and Gassner's *forma intermedia* is examined from the standpoint of their incidence in Rumania, their individual morphology and virulence and the genetic and taxonomic validity of the *Typus triticoides* Săvul. According to material collected in 1939, the species was recorded as later occurring frequently with *T. foetens* but was not found with *T. tritici*.

Tests of the virulence of *T. triticoides* as compared with *T. tritici* and *T. foetens* were made on the pure lines of wheat Cenad 117, A 26, Odvos 241, Zemka, Cooperatorka, Bankut 1201 and Tigăngesti 902. All these lines proved susceptible to all three species. *T. foetens* showed the highest virulence. *T. triticoides* showed a higher percentage of infection than *T. tritici* but a lower one than *T. foetens*.

The different wheat lines and varieties also differed in their reaction to the four *Tilletia* species. Further experiments with a larger collection of wheats are planned on the specialization of the four *Tilletia* species in Rumania, evidence of the existence of different biological type complexes having already come to hand.

Considering the differences above referred to between *T. tritici* and *T. triticoides* as well as their distinctive morphological features and the fact that *T. triticoides* does not resemble a hybrid between *T. tritici* and *T. foetens* and does not exhibit any segregation phenomena in its progeny, the author maintains that *T. triticoides* Săvul. is a homozygous type that is a valid independent species.

792. KOTILA, J. E. 632.472.3:576.16:633.63

A new sugar beet leaf blight caused by a strain of *Corticium solani*.

Phytopathology 1943 : 33 : 6-7. (Abst.).

A new strain of *Corticium solani* causing foliage blighting of sugar beets and its symptoms are described. The severity and incidence of the attack is dependent on periods of high humidity.

R. M. I.

793. CHILTON, S. J. P. 632.483:575.242:575.2

Variations in sporulation of different isolates of *Colletotrichum destructivum*.

Mycologia 1943 : 35 : 13-20.

Single spore cultures of *C. destructivum* O'Gara have been found to lose their ability to produce conidia in any quantity when kept in culture. An investigation of the cause showed that poorly sporulating variants arise and replace the original type.

These variants are thought to be genetic entities differing from the cultures from which they arose as mutants. Possibly the nuclei in the original mycelium are heterozygous diploids which could fuse and segregate in the mycelium, thus giving rise to variant types.

794. EXNER, B. and CHILTON, S. J. P. 632.485:576.16
Variation in single basidiospore cultures of *Rhizoctonia solani*.
Phytopathology 1943 : 33 : p. 3. (Abst.).

Single basidiospore cultures of *Rhizoctonia solani* totalling 395, were isolated from stems of Lima bean, Irish potato and alligator weed. Comparisons showed that as many as 29 distinct cultural types occurred among isolates from a single basidial mat and suggest that segregation probably occurs during basidiospore formation. R. M. I.

795. EXNER, B. and CHILTON, S. J. P. 632.485:576.16:633.491
Cultural differences among single basidiospore isolates of *Rhizoctonia solani*.
Phytopathology 1943 : 33 : 171-74.

A large number of single basidiospore cultures made from 10 basidial mats of *Rhizoctonia solani* showed differences in many characters and suggested that segregation occurred in the formation of the basidiospores. R. M. I.

796. HILDEBRAND, E. M. 632.8:576.16
Strains of yellows virus in Montmorency cherry.
Phytopathology 1943 : 33 : p. 6. (Abst.).

Two strains are described and the possibility of the existence of others is not excluded. R. M. I.

797. BLACK, L. M. 632.8:576.16:633.491
Different vector specificities for varieties of a plant virus.
Phytopathology 1943 : 33 : p. 17. (Abst.).

The occurrence of two distinct potato yellow dwarf viruses is noted. One is transmitted only by the leaf hopper *Agallia constricta* and the other only by *Aceratagallia sanguinolenta*. R. M. I.

798. CORBETT, C. E. 632.951.1(81)
 Plantas ictiotóxicas. Farmacologia da rotenona. (**Fish poison plants.**
Pharmacology of rotenone.)
Monogr. Fac. Med. Univ. S. Paulo 1940 : No. 1 : Pp. 157.

An account is given of the many species of plants in Brazil that contain toxic substances suitable for use as fish poisons and insecticides. The richest is *Lonchocarpus nicou* (Aubl.) Benth., with 8-12% of rotenone. A great many others are listed, with indications of their systematic position and local name, and the various countries where they grow. The major portion of the work is devoted to a study of the physical, chemical and physiological properties of rotenone. There is a useful bibliography of 91 references.

799. 632.951.1:575(73)
 Seed World 1943 : 53 : No. 2 : p. 40.
 633.16:575(73)
 633.913(73)

Research work and workers.

Seed World 1943 : 53 : No. 2 : p. 40.

Experiments at the Oklahoma station have shown that the seeds of the native shrub *Amorpha fruticosa* contain rotenone. Strains of high rotenone content are being sought with a view to commercial development.

Studies over a 15-year period at the University of Illinois rate Wisconsin Barbless as the best spring barley as regards both yield and quality.

One wild variety of lettuce tested at the College of Agriculture, University of California, yielded 29% latex from its stalk as compared with 25% from guayule after three years growth.

ECONOMIC PLANTS 633

800. MORRISON, B. Y. 633-1.524:578.08(73)
The technique of plant exchange.
Agric. Amer. 1943 : 3 : No. 1 : 3-6.

The article deals with the practical requirements and the methods of plant exchange viewed from the official standpoint of the United States authorities concerned with the regulation and/or promotion of plant introduction and exchanges between the United States and other countries.

Illustrations of some of the necessary frames, greenhouses and other installations are shown.

CEREALS 633.1*

801. MÜHLE, E. 633.1-2.452-1.521.6
Die Rostpilze der wichtigsten zur Samengewinnung angebauten Futtergräser. (The **rust fungi of the most important forage grasses grown for seed**).
Phytopath. Z. 1942 : 14 : 83-101.

This survey of published information on rust diseases of the most important forage grasses—cereals and others—discusses *inter alia* specialization of the causal fungi for certain grasses. There is a useful table showing the incidence of various species or varieties of rust on different grasses as recorded in the literature of the subject.

Among the methods of control, breeding for resistance is mentioned and the collection of the necessary preliminary data on incidence, etc., of rust diseases in Germany is urged. The possible existence of physiological races is another problem calling for the attention of the German plant breeder.

802. VENAUXT. 633.11:575(67.5)
La culture du blé au Tchad. (The **cultivation of wheat in the Chad region**).
Bull. Agric. Congo Belge 1941 : 32 : 118-25.

The need in the Chad district for improvement in yield by selection and the introduction of wheat varieties, etc., is indicated, and some of the local wheats are described.

803. GULL, P. W. 633.11:575(76.2)
633.16:575(76.2)
Wheat and barley show possibilities if, when needed.
Miss. Fm Res. 1942 : 5 : No. 8 : p. 3.

Hardired and Sanford wheat varieties gave higher yields than the others in the test under the adverse conditions of heavy infestation by *Toxoptera graminum*.
The Texan variety of barley gave the poorest yield under infestation by *Toxoptera graminum* and *Helminthosporum sativum*. Wang and Missouri No. 48373 were also heavily attacked by the spot blotch disease. The poor showing of Texan should not exclude it from further trials since it is smooth-awned and considerably resistant to powdery mildew.

804. PAIVA, O. 633.11-1.4:631.521.6:575(81)
Notas sobre fisiología e selección de trigo. (Notes on **physiology and selection of wheat**).
Rev. Agron., Brazil 1942 : 6 : 535-36.

Some wheat varieties have been found to be much more susceptible than others to effects of soil pH; certain varieties lose their growing point entirely in acid soils, others lose a few leaves and some appear to be unaffected. The local Brazilian wheats are on the whole less sensitive than imported wheats, but these resistant varieties are all inferior in baking quality.

805. GADEA, M. 633.11-1.524:575(56)
Los trigos convenientes para la cuenca del Ebro. (The **wheats suitable for the Ebro basin**).
Agricultura, Madrid 1942 : 11 : 132-36.

A brief description is given of the wheats most commonly grown in the extensive basin of the river Ebro and of certain imported varieties, such as Damiano, Ardito and Hope, which have been tried without success. Some of the other varieties from U.S.A. and Canada, though not themselves suitable for cultivation, possess properties that it is desired to introduce and are being used in crossing. For the unirrigated zones no introduced variety has shown the least promise and improvement is expected solely on the basis of the native varieties, either by selection or at most by crossing with some of the imported forms. The most promising varieties to serve as a starting point are the local wheat Catalán or Aragón and the three imported varieties Hybrid L 4, Mentana and Manitoba.

* See also Abst. 783.

† See also Absts 739, 749 and 790-1.

806. SUNESON, C. A. and 633.11-1.962.4:575
WIEBE, G. A. 633.16-1.962.4:575

Survival of barley and wheat varieties in mixtures.

J. Amer. Soc. Agron. 1942 : 34 : 1052-56.

The relative yield of a variety is not necessarily a criterion of its ability to survive in competition with other varieties grown in mixtures in the same locality.

The varieties Vaughn barley and Ramona wheat which have high yields were found to be poor competitors when grown in mixtures with other varieties which have slightly lower yields. The reasons for this are obscure. There did not seem to be competition during germination. The results suggest a limitation of the bulked hybrid population method of breeding.

807. WORZELLA, W. W. 633.11-2.111-1.521.6:575.116.1
633.11:664.641.016:575.116.1

Inheritance and interrelationship of components of quality, cold resistance, and morphological characters in wheat hybrids.

J. Agric. Res. 1942 : 65 : 510-22.

The mode of inheritance of gluten strength, granulation, carotenoid pigment content, crude protein, kernel weight, test weight and cold resistance was found to be quantitative and governed by several genetic factors. The consistency and magnitude of the inter-annual correlation coefficients for each of three crosses provides further evidence.

In the hybrids of American Banner x Trumbull the inheritance of gluten strength and protein content appeared to be monogenic.

Single factor differences were found to govern the inheritance of the characters glume, coleoptile, and straw colour. The inheritance of kernel colour was governed by one pair of genes in two of the crosses and by three pairs in the third.

Inter-character correlations show little association between cold resistance and the components of quality studied.

Most of the correlation coefficients were low in magnitude or not significant. Gluten strength and granulation were inherited independently of the other components of quality, granulation was correlated negatively with test weight, carotenoid content was correlated negatively with kernel weight and test weight, while kernel weight was correlated positively with test weight.

808. HOLTON, C. S. and 633.11-2.451.3:576.16
JOHNSON, A. G.

Physiologic races in *Urocystis tritici*.

Phytopathology 1943 : 33 : 169-71.

Tests of two collections of *Urocystis tritici*, one from Arlington Farm, Virginia and the other from Goldendale, Wash. showed that two distinct physiological races are represented. The reaction of the wheat varieties Federation, Baart and Oro x Federation hybrids to the two races is tabulated.

R. M. I.

809. THATCHER, F. S. 633.11-2.452-1.521.6:581.1
633.11-2.452-1.521.6:581.1

Cellular studies in relation to rust resistance.

Phytopathology 1943 : 33 : p. 14. (Abst.).

The association of the degree of permeability of the host cells with resistance to rust is further corroborated and an hypothesis offered in explanation.

R. M. I.

810. GREANEY, F. J. and 633.11-2.484-1.521.6
WALLACE, H. A. H.

Varietal susceptibility to kernel smudge in wheat.

Phytopathology 1943 : 33 : 4-5. (Abst.).

Varieties of *Triticum durum* were more susceptible to kernel smudge caused by species of *Alternaria* and *Helminthosporium sativum* than those of *T. vulgare*. Of the varieties of hard red spring wheat tested, Apex and Thatcher were more susceptible than Renown and Regent.

R. M. I.

811. HARRIS, R. H. 633.11:664.641.016
OLSON, R. V. and

JOHNSON, J. (jun.)

Viscosity changes in sodium salicylate dispersion of hard red spring wheat gluten in relation to variety and environment.

Cereal Chem. 1942 : 19 : 748-63.

Sixty-eight samples of thirteen varieties of hard red spring wheat were obtained from six different stations. Twenty were grown in 1939 and forty-eight in 1940.

Results show that the environment and the variety of the plants examined had but a small effect on the protein content and loaf volume.

The variety and environment had a substantial influence on the rate of gluten dispersion in sodium salicylate. Thatcher had the lowest rate of dispersion. Wheat grown in 1940 showed greater environmental variations than wheat grown in 1939.

812. BOEUF, F. 633.11:664.641.016:575(44)

The problem of wheat production in France and in French North Africa.

Int. Rev. Agric. 1942 : 33 : 221T-40T.

Wheat cultivation and its development in France and in French North Africa are considered from economic and geographical standpoints, with comments on relevant problems of cultivation.

The various reasons for the relative backwardness of research on wheat improvement and plant genetics in France are examined and the present position is contrasted with the advances made in North Africa where there is a much clearer realization of the basis and essential requirements for progress in wheat breeding and improvement.

The importance of problems of regional adaptation and of disease resistance in the production of new varieties is stressed with special reference to the tastes confronting French breeders. Qualitative improvement too and the methods of determining the strength of wheat are discussed.

The best official and other methods of ensuring the distribution and use of improved wheats are outlined and the importance of controlled seed production in maintaining the new types in a sufficiently pure state is made clear with special reference to French conditions and their economic background.

813. BAILEY, R. S. 633.11:664.641.016:578.08

A method for the formulization of farinograph curves.

Cereal Chem. 1940 : 17 : 701-06.

A method is described by which the farinograph curve can be expressed as a formula.

OATS 633.13*

814. WALLER, E. 633.13:575(48.5)

Svalöfs Solhavre II. (Vg 01534 a) Ny medeltidig, mycket stråstyv vithavresort för södra och mellersta Sverige. [Svalöfs Solhavre II (Vg 01534 a)—A new medium early, very stiff strawed white oat variety for southern and central Sweden.]

Sverig. Utsädesföre. Tidskr. 1942 : 52 : 370-81.

This new oat, the main features of which are set out in the title, is derived from a Stjärn [Star] x Örn [Eagle] cross made with Svalöf material. The subsequent actual selection was carried out during many years at the Västgöta affiliated centre.

The records given here of its performance in various parts of the country show good yielding capacity among other desirable features.

815. O'KELLY, J. F. 633.13:575(76.2)

New oat varieties found of value in hill station tests.

Miss. Fm Res. 1942 : 5 : No. 8 : p. 2.

Several varieties of oats are reviewed, which can be used to extend oat production and increase the length of the harvesting season.

Victorgrain is a superior early plant. It has a short, fairly stiff straw and is disease resistant. Stanton, New Nortex and others are of value. Tennex and Fulwin are very winter hardy but they lack rust resistance.

816. WARNER, J. D. 633.13-2.45-1.521.6:575(75.9)

New oat varieties for the southeast. Florida's Quincy Nos 1 and 2, highly resistant to rust and smut, also show promise in Georgia and Alabama.

Sth. Seedsman 1942 : 5 : No. 12 : 9, 29.

Two new oat varieties Quincy No. 1 and Quincy No. 2 were distributed in the autumn of 1940.

* See also Absts 739 and 789.

They both carry genes of Victoria which has the characteristics necessary to overcome the weaknesses of all the other oats known to growers in Northwest Florida.

Quincy No. 1 was obtained by crossing Victoria with Kanota and selecting from the progeny for several years. It is a red variety with a high yield, resistance to rust and immunity to smut. It matures at a time intermediate between Fulghum and Red Rust Proof oats.

Quincy No. 2 is the result of crossing Red Rust Proof with a hybrid variety developed from a cross Victoria x Norton. It is a white oat with high resistance to rust and smut. It has a high yield and is late maturing. When it is planted on the same farm with Quincy No. 1 the combine season is considerably extended. Both varieties have awns which are almost completely removed when run through the combine. Quincy No. 1 appears to be better adapted to grazing than No. 2, because of its more upright and earlier growth.

Breeding is being continued in order to obtain newer varieties with the same high disease resistance and which are also more productive than the Quincy oats.

817. TERVET, I. W. and

HART, H.

633.13-2.452-1.521.6

Variation in reaction of Anthony oats to stem rust, *Puccinia graminis avenae*.

Phytopathology 1942 : 32 : 1087-90.

Experiments on the susceptibility of Anthony oats to race 5 of *Puccinia graminis avenae* to which it has hitherto been resistant led to the conclusion that there existed at least 2 strains of the variety not to be distinguished morphologically but differing in their reaction to race 5 of stem rust. It is suggested that periodic re-examination and re-selection within the variety is necessary for the maintenance of resistance.

R. M. I.

RYE 633.14

818. O'MARA, J. G. 633.14:576.356.5:581.143.26.035.1:581.162.5

A photoperiodism accompanying autotetraploidy.

Amer. Nat. 1942 : 76 : 386-93.

Observations and experiments showed that plants of autotetraploid *Secale cereale* reacted differently from the diploid with regard to length of day. The autotetraploid was fertile only under long-day conditions and the sterility was egg or zygotic sterility and not pollen sterility.

R. M. I.

MAIZE 633.15*

819. ANDERSSON, G. 633.15(48.5)

Om majsodling i Sverige. (Maize cultivation in Sweden).

Sverig. Utsädesfören. Tidskr. 1942 : 52 : 151-60.

An outline of the methods of cultivation of maize in Sweden, a forage crop formerly imported; the results of experiments in different parts of the country show that from the most important varieties, Pfarrkirchner, Eagle Hill, Manalta and 40/17, a selection from Manalta, satisfactory yields can be obtained.

R. M. I.

820. 633.15:575(76.3)

Louisiana hybrids make good out-of-state showing.

Sth. Seedsman 1943 : 6 : No. 2 : p. 39.

Of five Louisiana hybrids in tests of seven places in Mississippi where standard and new maize hybrids and varieties were compared, Louisiana 3802 was first in average for all locations and gave a yield which was 17% better than the average yield of the standard plants.

821. LANGHAM, P. G. 633.15:575(87)

Venezuela-1, una selección de maíz recomendable. (Venezuela-1, a maize selection to be recommended).

Circ. Minist. Agric. Cría, Dep. Genét. Inst. Exp. Agric. Zootec., El Valle, D.F., 1942 : No. 2 : Pp. 8.

Maize breeding on modern lines was begun in Venezuela in 1939. No success was obtained with varieties and hybrids imported from the United States, the best results being given by a mixture of two varieties from Cuba. The best plants were selected and the seed was again mixed and sent to various localities to be tested. The mass selection thus produced has done

* See also Absts 739 and 779.

well in all parts of the country and has been designated Venezuela-1. It grows rapidly, ripens early and is relatively resistant to insects attacking the cob; in good soils it has yielded up to 4,500 kg. per ha.

Work on the production of locally adapted hybrids is in progress.

822.

LANGHAM, D. G.

633.15:575(87)

635.67:575(87)

Maíz dulce, Venezuela-2—una nueva clase de maíz. (Sweet corn Venezuela-2, a new type of maize).

Circ. Minist. Agric. Cría, Dep. Genét. Inst. Exp. Agric. Zootec., El Valle, D.F., 1942 : Nc. 3 : Pp. 4.

Sweet corn imported to Venezuela from the U.S.A. has never been a success. Several thousand cobs of common Venezuelan maize were therefore examined and finally one cob containing 73 sweet grains together with 216 starchy grains was discovered. The sweet grains were sown and gave rise to plants bearing 100% sweet grains. These plants were crossed with Venezuela-1 to give them more vigour and the sweet grains borne on the hybrid cobs when sown gave rise to much more vigorous plants with all sweet grains; seed of this type is being distributed under the name Venezuela-2.

823. STADLER, L. J.

633.15:575.11.061.6

Gene action in anthocyanin synthesis in maize.

Amer. J. Bot. Suppl. 1942 : 29 : 17s-18s. (Abst.)

"Excised roots of certain strains of maize, cultured on agar with added mineral nutrients and glucose, synthesize anthocyanin. The genes A_1 , A_2 , and r^r , or suitable alleles, are essential to the synthesis. With genotypes a_1 (A_2 r^r) and a_2 (A_1 r^r), an anthoxanthin pigment is synthesized instead of anthocyanin. Certain alleles of r^r result in the synthesis of different quantities of anthocyanin, and with r^g (A_1 A_2) no anthocyanin is produced. The same 3 genes are essential for anthocyanin production in the vegetative organs of normally grown plants, except that r^r is not essential in the presence of B . Genotypes B (r^g A_1 A_2) and r^r (b A_1 A_2) produce the same anthocyanin, and in those tissues which may be pigmented by the action of either gene, the quantity of anthocyanin produced is in general greater with B than with r^{ch} , the r^r allele most effective in plant pigmentation.

Excised leaf sections of genotype r^{ch} (b A_1 A_2), floated on glucose solution, produce anthocyanin abundantly in epidermal cells. The amount of anthocyanin produced varies with the glucose concentration, and under the standard conditions used the reaction is sensitive to concentrations of the order of $10^{-4} M$. Various r^r alleles differ in quantity of anthocyanin produced at a given glucose concentration. In plants capable of anthocyanin synthesis through the action of B instead of r^r (genotype B r^g A_1 A_2) the excised leaf reaction is wholly negative, regardless of the concentration of glucose.

The excised leaf reaction is inhibited by dinitrophenol. Certain other sugars (fructose, galactose, xylose, lyxose) and certain sugar derivatives (sorbitol, glyceric acid, glyceraldehyde, hydroxypyruvic aldehyde) may be substituted for glucose with positive effects, though in some cases with lowered effectiveness. None of these results in anthocyanin production in genotypes a_1 , a_2 , or r^g .

824. STADLER, L. J. and

FOGEL, S.

633.15:575.113.061.6:575.2

Gene variability in maize. I. Some alleles of R (R^r series).

Genetics 1943 : 28 : 90-91. (Abst.).

The gene R affects anthocyanin pigmentation, some alleles producing colour in the plant, others in the seed, and some in both. Alleles from 19 relatively unrelated individual plants (chiefly from strains grown by different Indian tribes) were compared in back-crosses with r^{ch} (maximal plant colour) and r^g (no plant colour). It was found that the alleles differ (1) in specific regions affected and (2) in intensity of pigmentation in certain regions. The series is non-linear—that is, in various cases one allele excels another in pigmentation of certain regions, while the reverse is true of pigmentation of other regions. In such cases compounds show in each region pigmentation similar to that of the more pigmented parent. Few if any of the alleles studied were identical moreover in reaction to a modifier, in the aleurone colour in homozygous and heterozygous endosperms or in frequency of spontaneous mutation.

825.

633.15:575.12

Science for the farmer. Farm crops.

55th Rep. Pa Agric. Exp. Sta. 1942 : Bull. No. 429 : 10-11.

It was shown during yield of grain tests in 1941 at both Lancaster and the State College, that many corn hybrids out-yielded the open-pollinated varieties.

In the silage tests at the State College many of the hybrids out-yielded the standard silage varieties Lancaster Sure Crop and Sweepstakes, while at Montrose Lancaster Sure Crop was equivalent in yield to any of the hybrids tested, and Early Butler gave a greater yield of grain than any of the adapted hybrids.

Twelve or more potato strains which were immune to blight appeared very promising in 1941.

826. BROWN, W. L.

633.15:575.12

Those new sweet corn varieties. Science and not accident has brought us the improved types of to-day.

Seed World 1943 : 53 : No. 2 : 8-9.

Mention is made of the early production of sweet corn hybrids and a description given of the development of new or improved varieties, together with the difficulties involved.

827. HELSEL, P. E.

633.15:575.12

Development of sweet corn hybrids.

West. Cann. Pack. 1941 : 33 (12) : 13-16.

A description is given of the development of hybrids with increased yield and with disease resistance, the development of inbreds and the tests made to determine their value, types of hybrids and the production of hybrid seed.

828. STEELE, L. and

633.15:575.12

BRADSHAW, I. R.

633.15-2.7-1.521.6(73)

New hybrids foil old foes. Insects, diseases and drouth are being whipped to develop better hybrids for south.

Sth. Seedsman 1943 : 6 : No. 3 : 10, 39.

The breeding of maize hybrids better adapted to various climates and to resist diseases is briefly described.

It is stated that at least one inbred which was isolated and tested widely in hybrids throughout the South in the past two years, has shown a definite resistance to weevil attack.

829.

633.15:575.12(73)

Hybrid seed increase aids war program.

Sth. Seedsman 1942 : 5 : No. 12 : p. 17.

The use of hybrid maize seed has added 300 million bushels to the 1942 crop.

830. ROGERS, J. S.

633.15:575.12(76.4+76.7)

Speaking of yields . . . and Texas hybrid corn. Hybrids outstrip open-pollinated varieties in tests at four Texas substations and in Arkansas.

Sth. Seedsman 1942 : 5 : No. 11 : 9, 32, 36.

The yields of Texas hybrids during 1941 and 1942 are compared with those of commercial varieties, showing how great an increase may be expected by growing Texas hybrids. The results show that the best hybrid is No. 12, which is a double cross showing uniformity of ear and seems to be adapted to the eastern part of the state where rainfall is plentiful. No. 8, a double top cross hybrid, is slightly more variable in type than No. 12, since it has one parent which is an open-pollinated variety. It appears to be best adapted to areas where rainfall may be a limiting factor in corn production. No. 80 is rather similar to No. 8. The three hybrids are more susceptible to the ear worm and weevil than most of the open-pollinated varieties.

Until better white hybrids are developed No. 7-W is the only one recommended for commercial use particularly in East Texas. It is a double cross hybrid producing a very uniform medium sized ear, and outyields the standard varieties by more than 20%. The hybrid has extreme resistance to the ear-worm and weevil.

In addition to the production of inbred lines now used commercially, the Texas Experimental Station is developing better hybrids than those available at present, and these should be released in the next two or three years.

831.

LYERLY, P. J.

Some genetic and morphologic characters affecting the popping expansion of popcorn.

J. Amer. Soc. Agron. 1942 : 34 : 986-99; also Iowa St. Coll. J. Sci. 1942 : 17 : 98-99.

Details are given of the improvement of popping expansion of popcorn by hybridization of inbred lines.

The mean of a group of hybrids has only a slight difference from the mean of their respective parents, although in certain cases this does not apply.

Small, short and narrow kernels tended to give the highest popping expansion.

The effect of xenia on popping expansion was found to be too small to be of any significance.

832.

LINDSTROM, E. W.

Experimental data on the problem of dominance in quantitative character inheritance in maize and tomatoes.

Genetics 1943 : 28 : 81-82. (Abst.).

Using paired, randomized plantings of F_1 - F_2 and of F_2 - F_3 generations, the mean values of maize earliness (tasseling and silking dates) and of tomato fruit size were obtained. In contrast to the usual decrease of means with successive inbreedings, these characters showed an increase. In four crosses of maize inbreds the F_2 mean was significantly "larger" (later) than the F_1 ; and in another cross the F_3 was later than the F_2 mean. In one tomato cross (Yellow Cherry x King Humbert) the F_2 mean fruit weight was larger than the F_1 mean. These results may be explained on the hypothesis of a dominance in genes for small size, the case in maize being interpreted as dominance in fewer days to flowering. Certain forms of epistasis or other factorial interactions are admitted as a possible, though less probable, alternative explanation.

833. STADLER, L. J. and 633.15:575.243:537.531

ROMAN, H.

633.15:575.243:535.61-15

The genetic nature of X-ray and ultraviolet induced mutations affecting the gene A in maize.

Genetics 1943 : 28 : p. 91. (Abst.).

A study was made of the mutants of the gene A that most nearly approached the typical behaviour of gene mutations. All the three X-ray mutants studied showed lowered haploviability and involved loss of not only A but of additional genes affecting chlorophyll development. The four ultraviolet mutants studied were free from these associated effects.

834. SINGLETON, W. R. 633.15:575.243:575.125-181

Breeding behavior of C30 a diminutive P39 mutant whose hybrids show increased vigor.

Genetics 1943 : 28 : p. 89. (Abst.).

Purdue 39, the most widely used sweet corn inbred, mutated to a semi-dwarf form, C30. In crosses between the two the original tall P39 was completely dominant and the hybrid when selfed produced 25% of the C30 type; but when both forms were crossed to a common inbred the C30 crosses sometimes yielded significantly more than those with P39.

835. ANDERSON, E. and 633.15:576.16(79.1)

BLANCHARD, F. D.

Prehistoric maize from Cañon del Muerto.

Amer. J. Bot. 1942 : 29 : 832-35.

In a collection of 222 ears of prehistoric maize from Cañon del Muerto, Arizona, nearly 1,500 years old, the type of endosperm, colour of pericarp, cob and kernel size and shape of grain were examined. Apparently this prehistoric maize was unlike the modern Pueblo type but very similar to the maize now grown by the Papago and allied tribes.

836. RHOADES, M. M. 633.15:576.312.381

On the anaphase movement of chromosomes.

Proc. Nat. Acad. Sci. Wash. 1942 : 28 : 433-36.

An anomalous type of meiotic behaviour in maize is described where secondary centric regions are observed on the chromosomes; they behave in a manner essentially similar to the centromere, moving to the pole somewhat earlier than the centromere itself. They occur only in

plants having the abnormal chromosome 10 (see "Plant Breeding Abstracts", Vol. XIII, Abst. 167 and Vol. VIII, Abst. 1189) carrying extra chromatin near the distal end.

837. MCCLINTOCK, B. 633.15:576.356.2
The fusion of broken ends of chromosomes following nuclear fusion.
Proc. Nat. Acad. Sci. Wash. 1942 : 28 : 458-63.

Using the method already described (cf. "Plant Breeding Abstracts", Vol. XI, Abst. 979) two chromosomes 9 with broken ends were introduced into the zygote nucleus in a maize cross, one contributed by the male gamete and one by the female; the chromosomes from the different parents bore distinctive marker genes. Both genetic and cytological evidence was obtained showing that fusion had occasionally taken place between the two broken ends, leading to the formation of dicentric chromosomes. In other cases the two broken ends healed without fusion, showing that the unsaturated condition does not persist indefinitely.

838. JONES, D. F. 633.15:576.356.2:581.143
Growth changes associated with chromosome aberrations.
Genetics 1943 : 28 : p. 78. (Abst.).

"Paired red and dark purple areas in the endosperm of light colored maize seeds show out-growths in less than one per cent of the color alterations. In 111 cases examined so far, no deviations from normal growth accompany the loss or exchange of both *Bt* and *Pr*. Since *Bt* is close to the centromere and *Pr* near the middle, changes that include both gene markers involve a loss or exchange of almost the entire right arm of the number 5 chromosome. If the increased growth were due to the uncovering of recessive growth regulators or the accumulation of dominant growth stimulators, all or nearly all of the color changes which include both markers would be altered in growth. Since none of them are, something other than normal gene action is involved. The progeny from these mosaic seeds shows no unusual deviation from normal. Growth changes of this kind are lethal in embryos but survive when surrounded and nourished by normal tissue and furnish a basis for understanding the appearance of spontaneous neoplasms in other organisms".

839. JENKINS, M. T. 633.15:581.6:575(73)
Breeding corn for war. "No other cereal crop will produce as many food units per acre".
Seed World 1943 : 52 : No. 12 : 10-11.

The merits of hybrid corn are once more discussed and special reference is made to the waxy hybrids for production of starch to replace tapioca (see Absts 840 and 856).

Information is available for the production of borer-resistant corn hybrids suitable for planting in most of the infested territory.

840. SPRAGUE, G. F. and 633.15:581.6:575(77.7)
HIXON, R. M.
A new starch from corn. War experiments develop waxy corns to replace tapioca starch.
Seed World 1943 : 53 : No. 2 : 20-21.

SPRAGUE, G. F. and
HIXON, R. M.
Waxy corn—a new crop.
Fm Sci. Reporter 1942 : 3 : No. 4 : 10-11.

Each of the four inbred lines involved in Iowa 939 were crossed with a waxy strain of maize and the resulting hybrid was back-crossed with the original inbred line. Back-crossing was continued through seven or more generations and in each generation tests were made to be certain that the waxy character was present. In this way the waxy character was freed from most of the undesirable characteristics of the original stock and then re-isolated by selfing. A limited number of comparisons involving Iowa 939 and waxy 939, indicated that the waxy type was about 10% lower in yield; a number of additional inbred lines are being converted to waxy types and from them it may be possible to produce high yielding waxy hybrids. Since the waxy character is inherited as a simple recessive and is masked by pollen from normal plants, fields planted with the waxy maize will have to be semi-isolated from the ordinary maize fields.

The authors say that until they have more knowledge concerning isolation and production problems their waxy corn stocks will not be released for general use.

841. REEVES, R. G. and
MANGELSDORF, P. C. 633.15:582:576.16
A proposed taxonomic change in the tribe Maydeae (family
Gramineae).
Amer. J. Bot. 1942 : 29 : 815-17.

The relationships of *Euchlaena mexicana* Schrad. to *Zea* L. may be regarded as established, but *E. perennis* Hitchc. shows greater deviations from the genus *Zea* than the former species (cf. "Plant Breeding Abstracts", Vol. X, Abst. 760). The following statements apply to *E. mexicana* but not all of them to *E. perennis*:—

In gross morphology neither genus possesses a character lacking in the other and the length of day reaction is also similar.

The diagnostic validity of the way in which certain morphological features of the three genera *Euchlaena*, *Tripsacum* L. and *Zea* have been used to demonstrate the close relationship of the first and last is questioned, since *Zea* has been cultivated and selected for these very characteristics.

The natural *Zea-Euchlaena* intergrades commonly recorded may well be of hybrid origin and the two genera, in the authors' opinion, conform very well to closely related congeneric species.

Evidence of their affinity is provided by the inter-fertility of the two genera, their identical chromosome number and the morphological similarity of their chromosomes, the crossing-over phenomena between their chromosomes, their almost identical gene loci and their susceptibility to many of the same pests and diseases; and there are strong indications that both are natives of tropical America.

The writers' earlier hypothesis that *Euchlaena* originated as a hybrid between *Zea* and *Tripsacum* is briefly touched upon; and the relationship between *Tripsacum* and the other two species is shown to be of an entirely different order as compared with the affinity between *Zea* and *Euchlaena*.

In proposing a revision making *Zea* and *Euchlaena* congeneric the authors describe the revised genus *Zea* L., indicating its limits and the synonyms for the two species *Z. mexicana* and *Z. perennis*. The propriety of recognizing the latter form as a distinct species is discussed.

842. YOUNG, H. C. (jun.) 633.15-2.4-1.521.6:578.08
The toothpick method of inoculating corn for ear and stalk rots.

Phytopathology 1943 : 33 : p. 16. (Abst.).

A method for inoculating maize with *Diplodia zeae*, *Gibberella zeae* and *Helminthosporium* sp. by means of hollow toothpicks containing the inoculum is described. Marked differences in reaction to the different fungi were noted in selfed lines of maize.

R. M. I.

843. ELLIOTT, C. 633.15-2.411.4-1.521.6:575
A *Pythium* stalk rot of corn.

J. Agric. Res. 1943 : 66 : 21-39.

Cultures of *Pythium bulleri* were isolated from two infected inbred lines of yellow dent maize, K.167 and C.1.6, growing in the field.

C.1.6 was inoculated, in the field, during periods of high temperature and high humidity, with these cultures and it was observed that infection developed on both wounded and unwounded stalks. Inoculations made when the temperature was lower produced little or no infection. Five plants of C.1.6 were inoculated, in the greenhouse, with each of four different cultures and so far as could be observed the plants were not wounded. All the cultures infected some of these unwounded plants.

C.1.6 and twelve other inbred lines of yellow dent maize were inoculated, in the greenhouse, with a culture designated 40-G-4c. Three days later all but 8 of 65 inoculated plants had fallen over. Only one inbred, I11 Hy, showed any marked resistance to this culture.

A month later a limited number of plants of the same 13 inbreds were inoculated with culture 40-G-4c. Although the average temperature was higher, conditions were apparently less favourable for infection. Infection developed less rapidly and differences between the inbreds were more apparent. Kyl3 as well as I11 Hy showed the most resistance.

In these last two experiments infection developed on wounded as well as on unwounded stalks.

844. STANDEN, J. H. 633.15-2.484:576.16
Variability of *Nigrospora* on maize.
 J. Sci. Iowa St. Coll. 1943 : 17 : 263-75.
 The author found that the diameters of the spores of *Nigrospora* occurring on maize in Iowa during the seasons 1938 to 1941, lay outside the ranges of those of either *N. oryzae* and *N. sphaerica*, which Mason determined as being from 13.5 to 14.9 μ and 16.5 to 17.8 μ , respectively. The size of the spores showed no relationship to symptoms in the infected tissues.
 The average diameter of the spores tended to become fairly uniform in culture but *Nigrospora* isolates were extremely variable in respect to colour and appearance of the mycelium and in rapidity and abundance of sporulation; there was no uniform relationship between spore size and cultural characteristics.
 Isolates from other infected tissues also showed wide variability in respect to spore size and other characteristics.
 From these results it became obvious that a choice had to be made between *oryzae* and *sphaerica* as the specific name of *Nigrospora* occurring on maize in Iowa. Since it was found that collections with large spores tended to produce small spores in culture, it was difficult to differentiate a large-spored species and so all Iowa collections are referred to as *N. oryzae*.

845. ELLIOTT, C. 633.15-2.484-1.521.6:575
***Helminthosporium turcicum* leaf blight of field corn inbreds and hybrids.**
 Phytopathology 1943 : 33 : p. 18. (Abst.).
 Some inbred lines of maize are resistant to spotting by *Helminthosporium turcicum*, some very susceptible and others intermediate. All the progeny of crosses with the very susceptible inbred line, Ia. ITE 701, were moderately or heavily infected. R. M. I.

846. HUBER, L. L. 633.15-2.7-1.521.6(73)
Later planting reduces corn borer damage.
 Bi-m. Bull. Ohio Agric. Exp. Sta. 1942 : 27 : 72-73.
 Considerable damage was done by corn borers in a field where planting had taken place on 7th May. Slight damage was caused in a field in a neighbouring area with equally productive soil, where planting of the same strain took place two weeks later. A rough estimate shows that one may expect about 3% reduction or more in corn borer population for each day's delay of planting.
 There are many farms where the borer is most abundant, on which the use of a good hybrid will secure reasonable control of the borer, so that strict attention would not be needed to the planting date.

847. PATCH, L. H., 633.15-2.7-1.521.6:575
 STILL, G. W.,
 SCHLOSBERG, M. and
 BOTTGER, G. T.
Factors determining the reduction in yield of field corn by the European corn borer.
 J. Agric. Res. 1942 : 65 : 473-82.
 Plants in fields of maize were infested with different numbers of egg masses of the European corn borer, to determine the degree of effect on yield.
 The reduction of yield was shown to be proportional to the number of borers present up to 22 borers per plant. Earlier study has shown that hybrids were less affected than were open-pollinated varieties in the same plantings.
 Little success was obtained in attempts to find hybrids which maintained their normal yield after being infested.

848. PATCH, L. H. 633.15-2.7-1.521.6:575.12
Survival, weight, and location of European corn borers feeding on resistant and susceptible field corn.
 J. Agric. Res. 1943 : 66 : 7-19.
 The single-cross maize hybrid I11. Hy x R4, which is one of the most resistant strains to the European corn borer (*Pyrausta nubilalis*) was compared with one of the most susceptible strains, III. A x Ind. TR, to determine the factors responsible for resistance.
 It was found that the development of borers from a given number of eggs was slow on the

resistant plant. This was partly due to the fact that the tassel buds of the susceptible plants were available before those of the resistant plant; but the difference was mainly due to the unsuitability of the resistant hybrid for food.

It was found when tests were made using both detasseled and normal plants that the differences in the survival of the borers on the resistant and susceptible hybrids decreased as hatching took place nearer the pollen shedding stage.

The difference in survival of the borer on the resistant and susceptible hybrids was shown to occur during the first four days after hatching, at the time when the borers were mostly within the whorl of leaves. After this time survival was relatively the same in both plants. As the borers grew older they went to other parts of the plants and were eventually established in the ears and internodes. This process however took place to a greater extent in the susceptible than in the resistant hybrid.

BARLEY 633.16*

849. NILSSON-EHLE, H. 633.16:575(48.5)
 Kornförädlingen vid Svalöf och dess resultat. (Barley breeding at Svalöf and its results).
 Sverig. Utsädesfören. Tidskr. 1942 : 52 : 365-69.

This short summary foreshadows a full report that is soon to be published on barley breeding in Sweden since 1928.

Barley is grown all over Sweden and many different types of *Hordeum distichum* and *H. vulgare* = *tetrastrichum* are therefore required.

Various well known Swedish and Danish malting barleys are enumerated including Svalöf's Opal B, which has the highest malting quality of any barleys recently tested, and Svalöf's Freja (from Seger x Opal), which has surpassed Kenia in yield of grain and is also earlier ripening. Two new varieties, lines 40/13 and 40/15, derived from crosses of Maja with Freja and a sister line Seger x Opal 34/22, have surpassed Maja in yield, stiffness of straw, earliness and grain size and have also shown outstanding malting quality.

At the Kalmar Branch Station crosses with the Bavarian long strawed malting barley have resulted in very promising new varieties including 37/77 (from Isaria x Opal) which has surpassed Opal B and Freja in grain yield.

Svalöf and Östgöta are collaborating in the improvement of fodder barley of the *nutans* type, high yield and high protein content combined with the highest possible stiffness of straw being the objectives. Old land barleys from various districts have been widely used in crossing. Some outstanding new lines have been obtained from a Maja cross with a relatively stiff strawed line from Östgöta Flättring bred by Wälstedt and 212 selections are now being raised. Some land barley crosses with Kenia are also of importance.

Ultuna is concentrating on the production of fodder barley and a grain barley of the *erectum* type. Primus II has apparently been surpassed by newer lines some of which are derived from Primus II x Kenia.

At Västernorrland work is in progress on the problem of improving the earliness of the grain barley Svanhals to adapt it for more northerly regions.

No new six-rowed barley for Southern Sweden has been produced since Brio (1924), but Svalöf has obtained promising results by crossing Brio with the Danish barley Juli and the German Heines and other foreign varieties. Hybridization with the stiff-strawed two-rowed Kenia may, it is hoped, produce a six-rowed barley with improved stiffness of straw.

In discussing six-rowed forms from Norrland, mention is made of the remarkable new Edda barley (produced at the Jämtland Branch Station from Asplund x Vega) which has surpassed Vega in yield, while equaling it in stiffness of straw. It was to be put on the market in spring 1943.

Many new crosses with Edda were made last winter in the greenhouse (with controlled lighting) at Ekebo and the F_1 was sent to the Jämtland Branch where the F_2 is now growing.

Improvement of six-rowed barley for upper and inner Norrland is also in progress at the Upper Norrland Branch, extreme earliness being an essential aim.

Increased winter hardiness for Southern Swedish conditions is one of the main aims in breeding winter barleys at Svalöf. German, Dutch, Rumanian and other foreign barleys formed the original material in 1928 and used in hybridization to obtain transgressive forms for cold

* See also Absts 739, 799, 803 and 806.

resistance. From the crosses of the Dutch Mansholt with Pomeranian Nordland and Mansholt x Rumanian new varieties have been produced that are now included in the experiment plots and have survived the winter undamaged. One strain No. 40/16 (No. 7 in the annual comparative trials) is being multiplied up.

850. MARTINI, M. L. and

HARLAN, H. V.

Barley freaks.

J. Hered. 1942 : 33 : 339-43.

633.16:575.114:581.143.32

The paper contains an account of barley freaks produced by random crosses.

From the hooded Nepal barley the authors produced strains in which the hood was elevated on awns two inches in length, ones in which the hood is sub-sessile, and where the fertile flower produces a hood while the outer glume is awned.

A plant which has no chlorophyll in the awns or glumes was crossed on other forms, producing plants of different sizes and colour.

Other crosses resulted in variation of leaf shape, culm length and in rachis differences.

The authors suggest that the mating of abnormal plants provides a basis for the production of new material for selection.

851. MYLER, J. L.

Awn inheritance in barley.

J. Agric. Res. 1942 : 65 : 405-12.

633.16:581.46:575.11

The author reviews the literature on awn inheritance in barley.

Crosses were made between varieties of *Hordeum vulgare*. The numbers of awned and awnless in the F_2 of the cross Atlas (awned) x Awnless, indicated a two factor basis for awn inheritance. Study in F_3 revealed that plants classed as long-awned in F_2 could be divided into long- and short-awned. The F_3 classification further showed that the 9 genotypes expected were present in about the expected numbers. Atlas differs from Awnless in possessing two major dominant factors $LkLk$ and Lk_1Lk_1 for development of long awns. One dominant $LkLk$ produces short awns and the other $lkLk$ gives the awnleted condition.

In the cross Black Hull-less (awned) x Awnless the F_3 data were again used to correct the F_2 classification and showed that awn inheritance depends upon 2 factors.

The author was able to effect a satisfactory classification in the F_2 of the cross C.I. No. 5628 (awned) x Awnless, since he had become familiar with the heterozygous types from classifying the F_3 of the previous cross. C.I. No. 5628 carries the same awn factors as Atlas and Black Hull-less.

Since the heterozygous types for the Redrachis long-awned x Awnless cross must be identified from the difference in length of the central and lateral spikelets, it was not possible to separate them. The F_2 plants were classified as awned or awnless, and a two factor difference was shown by a 15 : 1 ratio. The results do not agree with those of Miyake and Imai; but they used different varieties.

The same difficulties were encountered in classifying the cross hooded Nepal x Awnless; because of this the awnleted and awnless types were combined. The explanation of the results from the F_2 assumes that both factors for awn development must be present before a hood can develop, and agrees with the explanation for awn inheritance. Nepal carries these factors in addition to the hood factor, K , which masks awn development. This explanation differs from the results reported by Miyake and Imai from their six-row awnless x two-row hooded cross.

The F_3 class was planted and the F_2 was classified on the basis of F_3 . F_2 and F_3 data showed that Nepal differs from Awnless in the three factors, $LkLk$, Lk_1Lk_1 and KK and both dominant awn factors must be present for the expression of hoods. Awnless carried the three recessives. A description is given of cases where a "rudimentary hood" caused by the factor KK developed on the short-awned and awnleted plants.

852. BRIGGS, F. N. and

STANFORD, E. H.

633.16-2.421.1-1.521.6:575.116.1.061.6

Linkage relations of the Goldfoil factor for resistance to mildew in barley.

J. Agric. Res. 1943 : 66 : 1-5.

A number of crosses were made between Goldfoil and Nepal 595. Goldfoil carries the factor

(*Mlg*) for resistance to mildew (*Erysyphe graminis hordei*) and the factors awned (*k*) and hulled (*N*). It has a white aleurone but carries one of the complementary factors *(*Bl*₁) for blue aleurone. Under favourable light conditions it develops a red pigment in the stems which was found to be due to a single factor designated *Rs*. Nepal 595 is susceptible to mildew, naked, awned and has a white coloured aleurone but carries the other complementary factor *(*Bl*) for blue aleurone. In contrast to Goldfoil the stems are always green.

The deviations from the numbers of *F*₂ plants, expected on the basis of a 9 : 3 : 3 : 1 ratio, indicated that the hooded and resistance factors are linked and that the blue aleurone factor (*Bl*) is also linked with the factor for resistance. The order of these three genes, known to belong to linkage group IV, cannot be clearly indicated but it is suggested as *Bl*, *K*, *Mlg*.

In a similar manner it is shown that the factors for hulled and blue aleurone (*Bl*₁) are linked with the factor for red stem. Thus the factor for red stem like the factors for hulled and blue aleurone (*Bl*₁) belongs to linkage group III. Once again the order of the genes cannot be clearly indicated. The suggested order is *N*, *Bl*₁, *Rs*.

853. DICKSON, J. G. 633.16-2.421.9-1.521.6(73)

Scab of wheat and barley and its control.

Fmr's Bull. U.S. Dep. Agric. 1942 : No. 1599 : Pp. 22.

In discussing methods of control of the disease in the U.S.A. the author mentions how scab resistant varieties of barley and wheat are being sought.

Peatland has the most resistance of the commercially grown six-rowed barley varieties, while Svansota is amongst the more resistant two-rowed barleys; but neither is adapted to a large section of the barley area. The hooded barleys are very susceptible to scab.

Chevron, Cross and several other barley varieties are fairly resistant, but they are not suited for commercial production in most areas. They are, however, being used for breeding new resistant varieties which are adapted to each area.

854. TAPKE, V. F. and 633.16-2.451.2-1.521.6:578.08
BEVER, W. M.

Effective methods of inoculating seed barley with covered smut (*Ustilago hordei*).

Phytopathology 1942 : 32 : 1015-21.

Two successful methods for the inoculating of barley grain with covered smut (*Ustilago hordei*) are described. Both are more effective than the usual method of inoculating seed by coating the surface with spores.

R. M. I.

MILLETS AND SORGHUM 633.17

855. LI, C. H., 633.171:575.127.2:576.356
PAO, W. K. and
LI, H. W.

Interspecific crosses in *Setaria*. II. Cytological studies of inter-specific hybrids involving: 1, *S. faberii* and *S. italica*, and 2, a three way cross, *F*₂ of *S. italica* x *S. viridis* and *S. faberii*.

J. Hered. 1942 : 33 : 351-55.

A polyploid series of plant species in the genus *Setaria* has been found, with chromosome numbers varying from 9, 18, 27 to 36. The authors have already expressed the view that *Setarias* with the basic number 9 are more primitive and that those with higher numbers are the result of hybridization in nature of species with unlike genomes followed by chromosome doubling. To test this the work described in this paper was undertaken.

A true hybrid was obtained from the cross *S. faberii* Herrn. x *S. italica* and another from an *F*₂ cross (*S. italica* x *S. viridis*) x *S. faberii*. The hybrids were numbered 1390 and 1405 respectively.

The lengths and widths of the ear-heads of the two hybrids as compared with the parents and the fact that the anthers do not dehisce are given as identifying both 1390 and 1405 as true hybrids.

The cytological aspects of the hybrids are the same so they are described together.

In diakinesis of the first division there are usually 9 bivalents and 9 univalents. The univalents

* The symbols for the two complementary aleurone factors *Bl* and *Bl*₁, appear to have been interchanged by an error in the text, though correctly printed in the tables.

often appear to be divided at this stage. The usual meiotic irregularities are observed. By taking the basic chromosome number of *Setaria* as 9, the presence of 9 bivalents and 9 univalents would mean the presence of two genomes. Both *italica* and *viridis* would possess genom A, and *faberii* genomes A and B. If the tetraploid *S. faberii* is the result of crossing in nature of *Setaria* sp. with A and B genomes, there should be a *Setaria* with genom B. Genom analyses of all *Setarias* are in progress. Since morphologically speaking *S. faberii* very closely resembles *S. viridis*, the ancestral type of *S. italica*, it is concluded that *S. viridis* can be regarded as the progenitor which contributes the genom A.

Most pollen grains from the hybrids were shrivelled and devoid of starch, 1390 had 7.7% of supposedly normal pollen grains and 1405 had 36.2%.

Selfing 1405 produced two seeds, 1396 none. Back-crossing 1396 to *italica* produced four, but from the other hybrid no seeds were obtained. Crossing 1405 with other species of *Setaria* produced two seeds. High female sterility indicates that the cytology of macrosporogenesis is similar to that of microsporogenesis. Colchicine treatment of the ear-head of plant 1405 gave 12 seeds, which suggests that the chromosome number had been doubled.

856. KARPER, R. E. 633.174:581.6:575(76.4)
New wartime crop may prove bonanza. Waxy endosperm sorghum producing special type of starch for industrial uses may also meet synthetic rubber needs.

Sth. Seedsman 1943 : 6 : No. 1 : 9, 36.

Ten years ago the Texas Experiment Station imported from the Philippine Islands a variety of sorghum known there as Batad, which has a waxy endosperm containing starch needed for special industrial purposes. This variety grew 10 feet high. It can only be used for hybridization if grown in the greenhouse during the short days of the winter.

By crossing to Batad and repeated back-crossing to the kaffir and milo parents, new varieties of Blackhul Kafir and Yellow Milo possessing waxy endosperm were developed.

Waxy endosperm in sorghum is a simple Mendelian recessive character so that the seed from the cross grew to plants bearing heads with 75% normal seed and 25% pure seed of the waxy type.

Breeding is taking place with Waxy Blackhul Kafir, the object of which is to produce new high yielding dwarf varieties, especially adapted to harvesting and threshing direct from the field with combine harvesters.

857. QUINBY, J. R. 633.174-2.411.4-1.521.6:575(76.4)
A solution of one farm labor problem. Combine varieties step up harvesting of grain sorghums; will cause expansion of 1943 acreage and aid war effort.

Sth. Seedsman 1943 : 6 : No. 1 : 11, 50.

A report is given on a number of new grain sorghum varieties which are more widely adapted to Texas than Wheatland milo. Martin's Combine milo, a selection from Wheatland, is resistant to Pythium root-rot, matures early and tillers very little. Westland is a Wheatland hybrid and apparently it is as well adapted as Martin's Combine milo. Another selection from Wheatland is called Dalhart Wheatland. All three varieties are probably the progeny of Wheatland naturally crossed with some other variety resistant to root-rot.

RICE 633.18*

858. DASS, C. M. 633.18(96.1)
Notes on padi varieties grown in Fiji.

Agric. J. Fiji 1942 : 13 : 94-95.

Sixty samples from the different rice growing districts of Fiji were used as material for trial and classification. Twenty samples were found to be pure, and forty contained mixtures, different districts supplying from two to six varieties.

It was noted that the same variety often had different names in different districts.

The popular variety Moka or Table Rice is late in maturing, while a variety from Vanua Levu designated "Table Rice grown in brackish water" ripened twenty-seven days earlier.

After two years observation the sixty samples were classified into twenty-nine varieties on the basis of maturation period, length of grain and yield per acre.

* See also Absts 741 and 742.

859. RYKER, T. C. 633.18-2.484:576.16:631.521.6

Physiologic specialization in *Cercospora oryzae*.

Phytopathology 1943 : 33 : 70-74.

Five definite races of *Cercospora oryzae* were differentiated as the result of tests on the rice varieties Blue Rose, Blue Rose 41, Fortuna and Caloro and a number of sub-races also occurred. Some varieties were resistant to all known races of the fungus.

R. M. I.

FORAGE GRASSES 633.2*

860. CHURCH, G. L. 633.21:576.312.35:576.356.5(73)

A cytological and morphological approach to the species problem in *Glyceria*.

Amer. J. Bot. Suppl. 1942 : 29 : p. 5s. (Abst.).

On examining the somatic chromosomes of the North American *Glyceria* species, *G. pallida*, *G. neogaea*, *G. pauciflora* and *G. erecta* proved to be distinct in having 14 large chromosomes and they also stand apart morphologically from the rest of the genus, some features of the floret having more in common with other genera with a basic chromosome number of 7, e.g. *Poa*, *Festuca*, *Puccinellia* and *Fluminea*. The other members of the section *Hydropoa* have small chromosomes in multiples of 10. The somatic complements of these species are: *G. striata* 20, *G. elata* 20, *G. canadensis* 60, *G. obtusa* 40 and *G. melicaria* 40. *G. grandis* holds an intermediate position in the section with 20 medium size chromosomes. The section *Euglyceria* has small chromosomes in multiples of 10. Diploid species ($2n = 20$) include *G. borealis* and *G. Cookei*; tetraploid species ($2n = 40$), *G. septentrionalis*, *G. acutiflora*, *G. occidentalis* and *leptostachya*. *G. fluitans* is represented by a diploid form ($2n = 20$) in the upper Sacramento Valley, whereas the Pacific and Atlantic coastal forms are tetraploid.

861. MYERS, W. M. 633.22:575.14

Heritable variations in seed set under bag among plants of orchard grass, *Dactylis glomerata* L.

J. Amer. Soc. Agron. 1942 : 34 : 1042-51.

Plants of *Dactylis glomerata* were self-pollinated by having parchment bags placed over their panicles. The number of seeds per panicle set under bag varied from 0 to 200.

Further work with the offspring of the first generation showed a reduction of nearly 26% in the number of seeds set under bag.

With open-pollination of the progeny there was also a reduction but not so well marked. It was found that within the inbred families vigour was not closely correlated with the ability to set seed under bag.

Thus the attempt to improve the strain by firstly inbreeding is prevented to a large extent by the inability to set seed under bag. This does not indicate, however, that improvement by this method of breeding is impossible.

More data on later generations of inbreeding will be required before a decision can be reached.

862. MYERS, W. M. 633.22:575.14:576.356

The effects of inbreeding upon meiotic irregularity in plants of *Dactylis glomerata*.

Genetics 1943 : 28 : 83-84. (Abst.).

Meiotic studies were made on a natural autotetraploid, using inbred plants from 8 clones known to differ significantly in meiosis. The plants in each progeny segregated for quadrivalent frequency per sporocyte; in 6 progenies the value was close to that of the parent, in the other two the quadrivalent frequency had increased significantly with inbreeding. In all families the inbreds were higher than their parents in percentage of metaphase I with univalents, anaphase I with lagging univalents and quartets with micronuclei. Differences between parent and inbreds were observed also in frequency of half-chiasmata per chromosome.

863. BANFIELD, W. G. and

STUCKEY, I. H.

633.23:576.312.35

Extent of intercrossing among *Agrostis* species.

Amer. J. Bot. Suppl. 1942 : 29 : p. 2s. (Abst.).

"Preliminary study shows correlation of chromosome number with morphological characters in *Agrostis* species. There is as yet no definite evidence whether *A. tibba* and *A. tenuis* are distinct species or variants of the same species".

* See also Absts 801 and 934.

864. JULÉN, G. 633.24:581.162.31
Om möjligheterna att genom självbefruktning av timotej framställa förbättrade stammar. (On the possibilities that by the self-pollination of timothy improved strains may be produced).
Sverig. Utsädesfören. Tidskr. 1942 : 52 : 258-82.

To test the possibility of improving timothy by selection from self-pollinated plants, nine plants were chosen and from them five generations grown. These were investigated for yield, regrowth, earliness and resistance to rust. In spite of rigid selection, the average yield decreased from generation to generation. In certain lines, however, by selecting seed from the highest yielding plants, the yield by the I_4 was higher than that of the parent plants. The depression caused by inbreeding affected the regrowth of later generations but those lines with increased growth also showed an increased regrowth. As regards earliness, strongest plants after repeated selection in the I_4 showed slightly earlier development than the average of the original plants.

Resistance to rust, *Puccinia graminis phleipratensis*, was not increased by the inbreeding. However, certain lines did show resistance which could be improved by selection. R. M. I.

865. BURTON, G. W. 633.282-2.4-1.521.6
Tift Sudan, a utopia grass for Southeast. 633.282:575.127.5:633.174
Sth. Seedsman 1942 : 5 : No. 1 : 7, 31, 35.
(From Exp. Sta. Rec. 1942 : 87 : p. 535).
"This new variety, developed by hybridizing Sudan grass strains susceptible to foliage diseases with the disease-resistant Leotisorghum, is said to be disease-resistant, to yield twofold in hay over common Sudan grass, and to provide excellent pasture. It contains more of the poisonous prussic acid than common Sudan grass, but in the humid Southwest where sorghums have been grazed there is little likelihood of livestock poisoning from grazing Tift Sudan. Limited seedstocks are said to be available".

866. JOHNSON, B. L. and 633.285:575.127.5:576.356
ROGLER, G. A. 633.285:582
A cyto-taxonomic study of an intergeneric hybrid between *Oryzopsis hymenoides* and *Stipa viridula*.
Amér. J. Bot. 1943 : 30 : 49-56.
The somatic chromosome number of *S. viridula* was found to be 82, and of *O. hymenoides* 48 (cf. "Plant Breeding Abstracts", Vol. XII, Abst. 472), while the hybrid resulting from natural crossing between them has $2n = 65$. In contrast to the parent species the hybrids, which were sterile, exhibited great irregularity at meiosis (e.g. many lagging chromosomes and numerous micro-nuclei at telophase) and 100% pollen sterility was recorded. In height the hybrid equals or exceeds *S. viridula*, the taller parent. In type of inflorescence, shape of glume and of mature lemma, awn habit and other morphological features the hybrid is intermediate between the parents. Dominance of the *Oryzopsis* parent was expressed in the nervation of the palea and of the second glume, while the *Stipa* parent was dominant in respect of the nervation of the lemma. The hybrids discussed had been identified as *O. Bloomeri*, but the author on comparing them with the type specimens of *O. Bloomeri* and *O. caduca* holds that the hybrids are identical with *O. caduca* and differ in several important characters from *O. Bloomeri*. The geographical range of *S. viridula* and *O. hymenoides* in the region where *O. caduca* was collected further supports this view. The name and formula, *X Stiporyzopsis caduca* (Beal) (*Oryzopsis hymenoides* X *Stipa viridula*) are applied to the hybrid.

LEGUMINOUS FORAGE PLANTS 633.3*

867. KOEPPER, J. M. 633.31-2.452-1.521.6:575
Relative resistance of alfalfa species and varieties to rust caused by
Uromyces striatus.
Phytopathology 1942 : 32 : 1048-57.
Experiments were devised to test the resistance of alfalfa in the laboratory, greenhouse and field to *Uromyces striatus* Schroet.

* See also Abst. 776.

Plants of *Medicago ruthenica* Trantv., *M. falcata* L., 3 different variegated alfalfas and varieties, introductions and selections of *M. sativa* were used.

M. ruthenica, a 16-chromosome species, was most resistant and the suggestion is made that chromosome number might affect resistance, but further data are needed.

Taking all the results together *M. ruthenica* was most resistant, followed by *M. falcata* and Semipalatinsk; Ladak came next and is regarded as first of the commercially important varieties. A very resistant plant of the latter variety also showed resistance to blackstem, *Ascochyta imperfecta* Peck, and it is hoped that by crossing with such a variety as Turkestan, a superior strain, resistant and with good agronomic qualities might be produced. R. M. I.

868. ATWOOD, S. S. and

SULLIVAN, J. T.

633.322:581.6:575.113

Inheritance of a cyanogenetic glucoside and its hydrolyzing enzyme in white clover.

Genetics 1943 : 28 : p. 69. (Abst.).

Crosses between lines giving + and o reactions with picric acid gave F_2 populations segregating according to a bifactorial scheme. Back-crosses suggested that the original o parent was homozygous recessive for one factor and heterozygous for the other. Tests with preparations of the glucoside and of its enzyme showed that one of the two factors conditioned the glucoside and the other conditioned the enzyme.

ROOTS AND TUBERS 633.4*

869. CURTIS, L. C.

633.41:581.6:575

The effect of storage on the betanin and sucrose content of garden beets (*Beta vulgaris*) and its importance in a breeding program with this crop.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 370-74.

Results are presented which show that when spring grown beet root is stored for different periods of time at 40° F. the betanin and sucrose contents fluctuate. Results are also given which indicate that the sugar and betanin contents are sensitive to the temperature of storage. The author discusses the importance of these results to the breeder whose object is to select mother roots that transmit to their progeny the ability to produce the maximum amount of betanin and sucrose at the time of harvest. The normal practice is for seedsmen to select mother beet roots in the spring which were grown the preceding autumn and stored all the winter. Since however a progeny which at the time of harvest had a high betanin and sugar content may have a low content after storage, or may have a low pigment content and yet after storage be highly pigmented, it becomes obvious that selection should be made at the time of harvest.

870. WALKER, J. C.,

JOLIVETTE, J. P. and

MCLEAN, J. G.

633.41-1.9-1.521.6

Boron deficiency in garden and sugar beet.

J. Agric. Res. 1943 : 66 : 97-123.

Experiments showed that boron deficiency in the soil may be regarded as the cause of necrosis in the root of garden beets and that varietal differences occur in the reaction to this deficiency. Table beets are in general more susceptible than sugar beets. Furthermore variation between individual plants and between strains of garden beets is also a probable factor in the incidence of black spot disease. The variety Good For All proved very susceptible and two strains of Detroit Dark Red differed in their reaction under some field conditions. In investigating the nature of these differences the possible role of the size of the root system might be studied.

871. ESBO, H.

633.491:575

Potatisodlingen och dess viktigaste problem i olika länder. Erfarenheter från studieresor i Danmark, Tyskland, Holland och England. (Potato cultivation and its most important problems in different countries. Impressions from visits to Denmark, Germany, Holland and England).

K. LantbrAkad. Tidskr. 1941 : 80 : 481-505.

A general account of methods of potato cultivation in Sweden, Germany, Denmark, Holland and England, including the varieties most grown.

R. M. I.

* See also Absts 738, 769, 782, 795 and 797.

872. TEDIN, O. 633.491:575(48.5)
 Mål och vägar vid Sveriges Utsädesföreningens potatisförädling för södra Sverige. (Aims and means in the Swedish Seed Association's potato breeding for southern Sweden).

Sverig. Utsädesfören. Tidskr. 1942 : 52 : 105-15.

In this brief survey of the aims and methods used in potato breeding by the Swedish Seed Association it is noted that for early potatoes earliness is the only objective and for it yield may be sacrificed. In the second-early varieties yield will take the first place. In the main crop potatoes the special objectives are taste and quality as a foodstuff. In this respect a variety that does not discolour when cooked combined with other qualities is desired.

Taste is an important character that should not be neglected. Among other desirable characters are the shape of the tubers, which should be smooth and with eyes not deeply sunk, and a high vitamin C content. If the potatoes are grown for fodder, then a high starch content is the main consideration.

An all round sort is also needed with, as the ideal, the highest possible starch yield, tuber yield and quality.

Breeding for disease resistance has been intensively pursued with satisfactory results in some cases. Selection alone will not produce the desired results and much work with crossing is in progress, the methods of which are briefly described.

R. M. I.

873. BUSHNELL, J. 633.491:575"793":578.08(77.1)
 Experiments with early potatoes on sandy loam in southern Ohio.

Bi-m. Bull. Ohio Agric. Exp. Sta. 1942 : 27 : 63-70.

A description is given of the general methods used to determine whether the yield and quality of early potatoes could be increased by cultivating them on the sandy loam of the Washington County Truck Crops Experiment Farm. The importance of weather as affecting yield is discussed.

In the initial test of 1929, Irish Cobbler was shown to have a high yield. It was adopted as the standard early variety during the course of the later experiments.

Of five new early varieties tested in 1935, Warba was found superior to the standard in yield and matures a week earlier.

The size of seed pieces, rotation and cover crop, diseases and insect pests are also discussed.

874. PADDOCK, E. F. 633.491:575.127.2:576.356.2
 The backcross transmission of an inversion in an interspecific hybrid of *Solanum*.

Genetics 1943 : 28 : p. 85. (Abst.).

S. Douglasii Dunal and *S. nodiflorum* Jacq. are diploids ($2n = 24$) of the *S. nigrum* polyploid complex. Meiosis in their hybrid when *Douglasii* is female is nearly regular, but bridges with corresponding fragments indicate heterozygosity for at least one inversion. Such configurations were absent in all plants obtained by pollinating the hybrid by *S. Douglasii* and in some of those from pollinations with *S. nodiflorum*. The explanation offered is that the *nodiflorum* member of the chromosome pair involving the inversion bears a gene which reacts with the *Douglasii* cytoplasm of ovules which receive it in the hybrid to prevent their functioning. Crossing-over between this gene and the inversion could account for the absence of the inversion in heterozygous state in the exceptional *nodiflorum* back-cross plant. A configuration showing two bridges and two fragments at AII was evidence that at least three simultaneous chiasmata may form in a single pair of chromosomes.

875. COULTER, F. C. 633.491:576.16
 The story of garden vegetables. XIV. The potato: "A potato by analogy and Irish by adoption".

Seed World 1942 : 52 : No. 12 : 38-39.

An account is given of the history of the potato and its introduction into Europe, England, Ireland and N. America.

876. DOVE, W. F.,
 MURPHY, E. F. and
 AKELEY, R. V. 633.491:577.16:575
Varietal differences and inheritance of vitamins C and A in potatoes.
Genetics 1943 : 28 : 72-73. (Abst.).

Ascorbic acid was determined in 22 varieties of important American commercial table varieties, 15 promising seedlings, 14 German and two wild varieties. Variety values ranged from $20 \pm .70$ for a seedling to $40 \pm .40$ for Voran; high and low varieties resulted from the same cross but the seedling with the highest value ($40 \pm .35$) came from two high parents, Katahdin and Rural New Yorker. Ascorbic acid values were not associated with tuber volume, shape, eye depth, starch content, or earliness; pink varieties however gave consistently low values. Two varieties of known high vitamin A activity were among the lowest in vitamin C.

877. MACMILLAN, H. G. 633.491-1.524(83)
The aid of exploration in potato improvement.
Amer. Potato J. 1942 : 19 : 255-66.

An ambitious breeding programme, furthered by a wide exchange of seeds and plants and the search for and introduction of fundamental indigenous stocks is regarded as a major factor in any national agricultural economy. An account, in very general terms, is given of the introduction and early history of the potato. The need for further and more exhaustive collections is expressed; the search should be for (a) wider range of *Solanum tuberosum* forms similar to the domestic potato, (b) the original progenitors of the domestic potato or forms as closely as possible allied to it, and (c) the primitive species from which *S. tuberosum* may most probably have arisen by chromosome duplication.

The most profitable source of material is thought to be the 48-chromosome *S. tuberosum* group and the regions in Chile most likely to provide useful material are enumerated. It is admitted that "Chile alone may not yield the answer" and exploration of the areas of the primitive species may also be necessary.

878. STEVENSON, F. J.,
 SCHAALE, L. A.,
 CLARK, C. F. and
 AKELEY, R. V. 633.491-2.3-1.521.6
Potato-scab gardens in the United States.
Phytopathology 1942 : 32 : 965-71.

Twenty-two varieties of potatoes were tested for resistance to scab (*Actinomyces scabiei*) over a two-year period in 4 widely distant localities. Resistance was judged both by type of pustule and percentage of tuber surface covered with scab, both of which proved to be highly correlated. There were in general very significant differences between the varieties in their reaction to scab. The highly resistant varieties seemed to vary less between years or places than the susceptible ones. Significant interactions were found between variety and place and may be due to environmental factors or to physiological forms or to both. R. M. I.

879. DYKSTRA, T. P. 633.491-2.8:576.16
Potato virus diseases: review of literature 1941.
Amer. Potato J. 1942 : 19 : 267-79.

A useful review of recent literature, based in large measure on the abstracts appearing in the Review of Applied Mycology.

880. STEVENSON, F. J.,
 FOLSOM, D. and
 DYKSTRA, T. P. 633.491-2.8-1.521.6:575(73)
Virus leaf roll resistance in the potato.
Amer. Potato J. 1943 : 20 : 1-10.

A number of potato varieties and the progeny of crosses between some of them were tested by the field-exposure test at Beltsville, Md., to determine their ability to escape infection from the leaf roll virus for longer periods of time than the susceptible varieties Green Mountain and Chippewa.

Some of the European varieties, which have been reported as being resistant, and two American varieties seemed at first to be less readily infected than the two susceptible varieties, but after

five years only the European variety Triumph was free from leaf roll. No continued resistance was shown by fifty-four South American varieties or by a group of seedling varieties selected for their resistance to late blight from progenies of the German W races.

A number of progeny from crosses involving the American variety Katahdin as one of the parents showed more resistance than Green Mountain when first tested, but after they had been exposed for four to five years practically all the seedlings had become infected.

During five years testing of progeny at Maine some promising varieties were observed, among which were Kepplestone Kidney (European) x Earlaine (American) and Imperia (European) x Earlaine.

It is hoped that continued breeding with Katahdin and Earlaine may produce varieties with increased resistance.

Breeding for resistance of the tubers against the development of net necrosis as the result of the season's infection with the leaf roll virus has not been undertaken; but it was observed that three of the new varieties recently distributed, Katahdin, Chippewa and Sebago, seldom contracted this malady.

881. STEINBAUER, C. E. *et al.* 633.492:575(73)
Cooperative tests of sweetpotato varieties, introductions, and seedlings for starch production and market purposes.
 Circ. U.S. Dep. Agric. 1942 : No. 653 : Pp. 42.

The table and keeping qualities, relative yield and starch content, together with other characters of certain standard American varieties of the sweet potato (*Ipomoea batatas*) are tabulated. Porto Rico and Nancy Hall, which are extensively grown in the North, are outstanding in quality, but both varieties are highly susceptible to stem wilt. Triumph, which is grown in certain parts of the South, produces high yields, has an average table quality and shows some resistance to wilt.

The results of starch tests show that Red Bermuda, Red Brazil, Southern Queen and Triumph varieties are possible sources for commercial starch recovery.

Descriptions are tabulated of a number of less known types which showed some promise in the tests. Several varieties from this group with table quality and yield are listed and their derivations are given.

Further data are presented on the yields of certain varieties at five stations.

Results of the tests for determining the susceptibility to stem wilt in the field and the green-house indicate that considerable numbers of varieties and seedlings studied possess at least moderate resistance.

Many varieties included in the study appear relatively poor as market or starch yielding types, yet certain of them because of outstanding resistance to wilt or because of high starch percentages, may be valuable for use in breeding improved varieties.

882. COULTER, F. C. 633.492:576.16
Story of garden vegetables. XV. Sweet potatoes: one of the first American foods to reach the Old World.
 Seed World 1943 : 53 : No. 2 : 38-39.

A history is given of the sweet potato and its introduction into Europe, England and North America.

883. COCHRAN, H. L. 633.492:577.16
The carotene content of sweet potatoes.
 Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 259-64.
 ANONYMOUS.
Yellow sweet potato high in vitamin "A".
 Sth. Seedsman 1942 : 5 : No. 12 : p. 36.

From data presented in this paper it is evident that the yellower the potato the more carotene it contains and that there are varietal differences. Porto Rico is one of the highest yielders of carotene, of the named varieties grown to-day.

Carotene content has served as a basis for research on improving the edible quality of the sweet potato through the process of breeding. Since the parental stock used so far has been found to be quite heterozygous much segregation has resulted even in the F_1 generation hybrids. Some of the more promising seedlings derived from crosses made by Miller and Covington at the

Louisiana Station are given. The results show that the carotene content of sweet potato can be materially increased by breeding.

FIBRES 633.5*

884. BRIXHE, A. 633.51:575(73)
 Rapport sur une mission d'étude effectuée aux Etats-Unis du 5 août au 18 octobre 1939. (Report on a study mission made in the United States from August 5th to October 18th, 1939).

Bull. Agric. Congo Belge 1941 : 32 : 89-117; 1942 : 33 : 9-54.

In the first part of this paper the events leading to the drawing up of the programme of cotton research in the United States of America and other general aspects of cotton production, including the seed improvement policy, are outlined from the economic and agricultural standpoint.

In the second part the organization of cotton cultivation in the United States is described; and then follows an account of the genetical work, including selection, both official and private, treatment of the seed, comparative tests, the aims of selection and finally methods of harvesting.

R. M. I.

885. HARRISON, G. J. 633.51:575(79.4)
 Breeding California cotton. 633.51-2.484-1.521.6(79.4)
 Calif. Cultiv. 1941 : 88 : p. 696.

A fibre laboratory for research purposes, with controlled temperature and humidity, has been in operation since May, 1941. By means of X-ray tests some cotton varieties having fibre of exceptional strength have been discovered, though at present their yield is below average. Tests of resistance to *Verticillium* wilt have been made both in the laboratory and the field; the two tests have given comparable results. Wilt resistance has been shown to be generally associated with late maturity, small bolls and short staple but certain American-Egyptian varieties have also shown resistance. Direct selection, hybridization and back-crossing are all being used with success in the wilt resistance breeding and pure genetical research is being carried on at the same time.

886. BEASLEY, J. O. and 633.51:575.127.2:576.356
 BROWN, M. S. 633.51:581.162.5:575.11
 Asynaptic *Gossypium* plants and their polyploids.
 J. Agric. Res. 1942 : 65 : 421-27.

In F_2 populations of *G. hirsutum* x *G. barbadense* plants were found that flowered but produced no seeds. In these infertile plants less than half the 52 chromosomes paired and as a result of various meiotic abnormalities "tetrads" with from 1 to 13 microspores showing great variation in size were formed. Observations, however, at pachytene indicated that most of the chromosomes were paired as in asynaptic maize and peas. As far as could be judged from the material used doubling of the chromosome number by colchicine treatment did not restore normal synapsis.

Analysing the results of a number of American upland x sea-island crosses, in which different varieties were used, the authors conclude that the asynapsis which occurred in some of these crosses was conditioned by two pairs of recessive genes, one of which was in the homozygous condition in certain strains from three varieties of *G. hirsutum* and in two other varieties of *G. barbadense*.

The situation is discussed in the light of the findings of other workers. The suggestion that the induction of mutations which reduce chiasma frequency might be used to promote the regular formation of bivalents rather than multivalents in autopolyploids is rejected.

887. BROWN, H. B. 633.51:575.14
 Results from inbreeding Upland cotton for a ten-year period.
 J. Amer. Soc. Agron. 1942 : 34 : 1084-89.

Although many plants are injured by inbreeding, some varieties of cotton and other plants have been reported as being unchanged.

The characters on which inbreeding might have an effect are given as seed germination,

* See also Abst. 920.

vegetative growth, number of blooms, boll size, earliness as shown by bold opening, staple length, lint percentage and weight of cotton seed.

Over a 10-year period there was an average reduction of 6.2% in blooming rate, a 9.3% reduction in boll size and a 9.3% reduction in production of seed cotton. The other characters did not show changes of any significance.

888. WAELKENS, M. and LECOMTE, M. 633.51:575.42(67.5)
Le choix de la variété de coton dans les districts de l'Uélé et de l'Ubangui.
(Choice of cotton varieties in the Uele and Ubangui districts).
Publ. Inst. Agron. Congo Belge 1941 : Ser. Tech. No. 29 : Pp. 31.

A detailed account of the selections of the families 145 and 270 and certain other varieties, their characters and behaviour under various conditions. As a result of the investigation, D65 of family 270 is of most value to the manufacturer and C55 of 145 to the natives on account of its high yield of seed, but these findings require modification according to the district concerned.

R. M. I.

889. TURNER, T. W. 633.51:581.41:575
Seven-year experiment in cotton breeding at Hampton Institute.
Proc. Va Acad. Sci. 1940-1941 (1941) : 2 : p. 181.

The aim of the institute has been to breed a strain of cotton which has five-lock bolls. Of 55 varieties grown at the beginning none had five-lock bolls only. Oklahoma Triumph produces rather large bolls with three to five locks per boll. The five-lock bolls were less than 5% of the total for the plot. Trice had the same number of locks, but smaller and maturing earlier.

In 1934 there were 33 plants bearing five-lock bolls only, the numbers rising to 312 in 1940; the percentage of five-lock bolls for the plot was 92, rising to 96 in 1940. Bolls with five-locks are generally larger and may produce 10 to 11% more lint than those of four locks.

890. SEVERSON, H. 633.51:581.6:575(76.2)
A cotton empire geared to get results. Delta and pine land company of Mississippi, once plagued by floods and boll weevils, is now world's largest cottonseed dealer.
Sth. Seedsman 1942 : 5 : No. 11 : 22, 26.

This season the Delta and Pine Land Company, of Scott, Miss., planted its land with a new strain of cotton, Deltapine 14 (44 15). The report of the U.S.D.A. Agricultural Marketing Administration on the spinning quality is as follows; "Deltapine 14 (44 51). Very low percentage of manufacturing waste and strong yarns of good appearance combine to make this an outstanding variety in the test".

891. R., Z. 633.52:575:633.854.54
Aus einer Pflanze werden zwei. (Two plants from one).
Dtsch. landw. Pr. 1942 : 69 : p. 40.

Mentions the production by crossing of two flax plants with high yield of oil and good stems; their cultivation is expected to help to make Germany self-supporting in linseed. R. M. I.

892. R., Z. 633.52:575:633.854.54(43)
Erfolgreiche deutsche Oelleinzüchtung. (Successful oil-flax breeding in Germany).
Wien. landw. Ztg. 1942 : 92 : p. 15.

The work of the Kaiser Wilhelm Institute in breeding flax with a high oil content and increased fibre production is briefly noted.

Thousands of crosses made by the Institute show that the combination presents no technical difficulties. Some of the resulting hybrids have been crossed again with flax to improve the fibre. The final aim is to combine in one plant high grain weight, higher oil content, greater disease resistance and more and better fibre.

R. M. I.

893. RAY, C. (jun.) 633.52:575.127.2
Cytology and genetics in the flax genus, *Linum*. 633.52:576.312.35
Proc. Va Acad. Sci. 1940-1941 (1941) : 2 : 182-83.

Study of eighty-six collections, including thirty-one species shows that there are five different

chromosome numbers for the genus *Linum*: 8, 9, 10, 14 and 15, the most frequent being 9, the next most frequent 15. The chromosomes fall into three different size groups. Taking chromosome number and size group together there are seven different karyotypes.

L. usitatissimum has $n = 15$ and $2n = 30$. Crosses of varieties of this species indicate that flower colour and size, seed colour and capsule dehiscence are determined by multiple factors. Ciliation of the false septa in the capsules is determined by a single dominant factor. Heterostylism in *L. austriacum* and *L. grandiflora* is determined by a single factor difference. Of 3,236 crosses attempted between ten of the species, hybrids were only obtained with *L. usitatissimum* \times *L. angustifolium* and its reciprocal cross. Non-functioning of pollen on foreign pistils and arrested development of hybrid embryos are causes of incompatibility of the species. The possibility of obtaining hybrids from species, incompatible for the latter reason exists, if immature embryos are removed from the plant and cultured in nutrient solutions.

894. PARDO PASCUAL, M. 633.522-1.524(56)
Cañamos Turcos y del país. (**Turkish and local hemp**).
Agricultura, Madrid 1942 : 11 : 319-22.

The conditions of the present war have induced the Instituto de Fomento de la Producción de Plantas Textiles [Institute for Encouragement of Textile Plant Production] to explore once more the possibilities of extending the cultivation of hemp. No thoroughly adapted native varieties exist and comparisons of the best of these with certain Turkish varieties have shown the Turkish forms to be superior in yield of straw and fibre.

895. GROOF, G. DE 633.524.33:575(67.5)
L' *Urena lobata* jute Congolaise. (***U. lobata*, Congo jute**). 633.5(67.5)
Bull. Agric. Congo Belge 1940 : 31 : 7-55.

This paper dealing mainly with the promotion of the cultivation of *U. lobata* in the Belgian Congo contains a botanical description of the plant and notes on its numerous vernacular names in the Congo and other countries.

Seed selection was begun under the direction of the Institut National pour l'Etude Agronomique du Congo Belge in 1938 at the Muwazi Station and the first lot of improved seed was obtained in 1940. In the interval the new Gimbi Fibre Station [Station des Fibres], north-west of Matadi, was opened in 1939. The main plants studied are sisal and *Urena*.

The latter is to undergo mass and pedigree selection and the native methods of cultivation are to be improved. The aims suggested for the Institute's breeding programme are: high yield of fibre per ha.; the production of races with very fine fibre; resistance to diseases and pests; and the isolation of varieties or lines well adapted to the particular types of soil of the country. Brief notes are also given on other wild fibre plants of the Belgian Congo and their native names.

896. SINNOTT, E. W. and 633.528.2:581.47:575.061:575-181
BLOCH, R.
Fiber development in *Luffa*, the sponge gourd.
Amer. J. Bot. Suppl. 1942 : 29 : p.17s. (Abst.)

A study of the fibrous network that gives the luffa its economic importance was made in a considerable number of lines of *L. cylindrica* and *L. acutangula*. They were found to differ in the size and shape of the fruit and in the character of the fibre system.

Parthenocarpic fruits obtained by growth hormone treatment exhibit the same fibre development as normal fruits.

SUGAR PLANTS 633.6*

897. ABBOTT, E. V. 633.61:575(76.3)
Disease testing and initial seedling selection work at the Houma Station during 1940 and 1941. 633.61:575.127.2
Sug. Bull. N.O. 1942 : 20 : 137-41.

As a result of five years of roguing of Co. 290 in the Teche section, mosaic in this area has been considerably reduced. Varieties which might now be substituted for Co. 290 are compared with it in relation to mosaic, deterioration of the seeds, chlorotic streak and windrowing.

* See also Absts 740-2, 772 and 792.

Of the varieties discussed on their disease reaction in the 1940 report, C.P. 33/243 has been released. A description is given of the disease reactions of this variety and of three other C.P. varieties mentioned in the 1940 report, together with five C.P. varieties new to these reports. Further results are given on the disease reactions and windrowing of seven of the 1934 C.P. varieties which were introduced into the test fields in 1940.

C.P. numbers were assigned to 99 new varieties during 1940 and 1941 after determinations had been made on sucrose content and disease resistance. Many other varieties are still being tested.

Seedlings were obtained in 1941 from commercial crosses, from crosses where at least one parent had proved valuable for breeding, and from second and third generation nobilizations of the Turkestan cold-resistant wild canes. The procedure through which the seedlings will pass before any of them can be assigned C.P. numbers in 1943 is outlined in some detail.

Results obtained during three years are presented to show that as the Turkestan hybrids approach commercial type in the nobilization process, the proportion of mosaic resistant plants is being increased.

898.	ARCENEAUX, G., HEBERT, L. P. and KRUMBHAAR, C. C.	633.61:575(76.3) 633.61.00.14(76.3)
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Results of sugarcane variety tests in Louisiana during 1941.

Sug. Bull. N.O. 1942 : 20 : 149-55.

The performance of some new seedlings in preliminary trials as well as the varieties in the more advanced tests is recorded.

C.P. 28/19 was again commended for performance on muck soils, while among the new varieties C.P. 33/243, C.P. 33/253 and C.P. 34/79 are mentioned as giving relatively high yields of sugar per acre, though inferior to C.P. 28/19 in indicated yield of sugar per ton of cane.

C.P. 34/79 and C.P. 29/320 are recorded as highly susceptible to chlorotic streak—a defect which also reduces the value of C.P. 29/137 in spite of its good yields. Among 19 unreleased varieties in extensive plantation tests C.P. 34/120 has shown great promise in its sugar yield per acre and per ton of cane and excellent stubbling qualities.

899.	GOUAUX, C.B. Sugar cane test field report season for 1941.	633.61:575(76.3)
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Sug. Bull. N.O. 1942 : 20 : 142-46.

Increased plantings were made at the Louisiana Experiment Station in 1940, of the two promising varieties C.P. 33-243 and C.P. 34-120. C.P. 33-243 was released in the autumn of 1941 and C.P. 34-120 will be released in the autumn of 1942. A test is given of twelve unreleased C.P. varieties planted in the autumn of 1941.

Detailed results are presented of the regular test field variety plantings made at each of the test field locations during the season of 1941. It is shown that C.P. 34-79 ranked first in the plant cane tests at all the test fields except Youngsville and Glenwood, where it ranked second and third. However it showed its characteristic weakness as first stubble, except at Shirly, where it ranked second.

C.P. 34-120 has a good sucrose content as compared with C.P. 39-320 and its field performance in germination, stand, suckering and growth, as both plant cane and stubble was generally better than any of the standard varieties. Several other varieties showed promise as plant cane or stubble, at different test fields.

Results obtained in 1941, as well as in 1940 and 1939, indicate that C.P. 29-120 and C.P. 29-103 are very suitable as standard field varieties in many areas of the state.

900.	ARCENEAUX, G. Some varietal stalk characters of importance in the mechanical harvesting of sugarcane.	633.61:581.44:578.08
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Sug. Bull. N.O. 1942 : 21 : 17-19.

During the autumn of 1941 a number of sugarcane stalks were examined for the characters erectness of growth and resistance to lodging, which are of importance in connexion with mechanical harvesting.

“The discrepancy between the total stalk length and the straight difference between the two extremities” was taken as a measure of crookedness.

Of fifteen varieties tested C.P. 33/372 and 29/120 are regarded as the best suited and C.P. 34/30 and 28/19 the least suited to mechanical harvesting.

Uniformity in length of stalk is of importance in mechanical harvesting since most of the harvesters in common use cut all the stalks to approximately the same length of a given adjustment. C.P. 33/243 and 33/372 had stalks which were most uniform in length, while C.P. 31/529 and 34/80 showed the greatest amount of variation in stalk length.

The results also indicate that the variation in length of stalk of the varieties tested is affected by environmental conditions.

901. CROSS, W. E. 633.61-2.451.2-1.521.6(82)

Observaciones y ensayos culturales relacionados con el "carbón" de la caña de azucar. (Observations and cultural tests concerned with sugar cane smut).

Bol. Estac. Agric. Tucumán 1942 : No. 37 : Pp. 12.

An account is given of the behaviour of a number of varieties, some of which have so far proved completely free from attack; these are enumerated. Various cultural measures of control have been tried but without success.

902. WILSON, J. W. 633.61-2.7-1.521.6

Correlation of sugar yields with the per cent of joints bored by *Diatraea saccharalis* (F.). Sugarcane borer studies—1.

Florida Ent. 1942 : 25 : No. 2 : 19-24.

(From Rev. Appl. Ent. 1943 : 31 : Ser. A : 88-89).

In this experiment the sugar-cane varieties F31-962, POJ 2725 and F31-436 were classified according to the percentage of internodes injured externally by the larvae; the number of pounds of 96° sugar per ton was found to decrease progressively as the percentage of bored joints increased. Considering all varieties together, the average loss between neighbouring classes of canes was practically constant (7 lb. per ton) and this difference was also constant (10 lbs.) in F31-962, a small barrelled early cane with over 12% fibre. In POJ2725 and F31-436, large barrelled late varieties with under 10% fibre, the sugar lost when the percentage injury exceeded 20 was twice that when the percentage was 15-20. The highest losses occurred in F31-962, and the lowest in POJ 2725.

903. DREWES, H. 633.63:575:578.08

What's the news about garden beets? Quicker and more even in germination tests than regular seed, sheared seed also reduces costly labor of thinning seedlings.

Sth. Seedsman 1943 : 6 : No. 2 : 10, 35, 38.

The writer discusses the value of the machine which R. Bainer of the California A.E.S. built for breaking the sugar beet seed ball into segments.

The paper also contains an account of how new sugar beet varieties are produced.

904. COKE, J. E. 633.63:581.143.26:631.521.6

Disease and bolting resistance in varieties.

Spreckels Sug. Beet Bull., Calif. 1942 : 6 : p.4.

The paper records experimental results which show the degree of resistance of different varieties of sugar beet to Curly Top, bolting and mildew, at different seasons.

U.S. 22 and U.S. 23 show most resistance to Curly Top in early and late plantings. U.S. 33 and U.S. 12 are good varieties for mid-season planting.

U.S. 15 is most resistant to bolting at all times and so it can be planted early. Old Type is second and should be planted later.

U.S. 15 shows most resistance to mildew for December and January. Old Type comes second.

905. VIŽNEVSKI, V. P. 633.63-2.484-1.521.6:577.15

(The quality of catalase in the beetroot, and the resistance of sugar beet to *Botrytis cinerea* during storage).

Biohimija 1940 : 5 : 408-16.

A study was undertaken in spring of beet roots after storage during the winter to discover the connexion between resistance or liability to infection by *Botrytis cinerea* on the one hand and the energy of catalase, its distribution in the root tissues, and the presence of non-protein nitrogen compounds on the other. In selecting the beets *Botrytis* resistance was found to be directly correlated with excessive nitrogen content.

Resistant roots showed a much greater activity of their enzymes as compared with infected roots. Marked differences were also recorded in the activity of the enzymes of different tissue in resistant roots, whereas no (or hardly any) such differences appeared in the tissues of infected roots.

The higher the activity of the enzyme, the lower was the content of transferable nitrogen and sugar. The amounts of non-protein nitrogen and monosaccharide in resistant roots was larger than in non-resistant roots. Thus qualitative differences between enzymes of resistant and non-resistant roots are indicative of differences in vitality.

STIMULANTS 633.7*

906. SMITH, H. H. 633.71:581.46:575.113:576.356.5
**Effects of different proportions of specific chromosomal comple-
 ments on size in *Nicotiana*.**

Genetics 1943 : 28 : 89-90. (Abst.).

"From crosses among certain doubled or undoubled chromosomal forms of *Nicotiana Langsdorffii* Weism. ($n = 9$), *N. Sanderae* W. Wats. ($n = 9$), and the F_1 *Langsdorffii* x *Sanderae* the following polyploid combinations were obtained: LLLS, LLS, LSS, and LSSS. L represents a haploid complement of *N. Langsdorffii* (small-flowered species) and S a haploid complement of *N. Sanderae* (large-flowered species). The size of corollas in the intermediate types was directly proportional, on a logarithmic scale, to the relative amounts of *Langsdorffii* and *Sanderae* genomes present. When the data were arranged in series so that two complements of either species were added, one at a time, to different genetic backgrounds, it was apparent that the addition of the second complement caused a smaller change and rate of change in corolla size than the addition of the first. The effect of total chromosome number was observed by comparing the following 18 and corresponding 36-chromosome types: LL vs. LLLL, LL x LS vs. LLLS, LS vs. LLSS, LS x SS vs. LSSS, and SS vs. SSSS. In each type the length of the tubular part of the corolla was increased by the double number of chromosomes, but the limb measurement was not appreciably affected. The effects of four different single extra chromosomes from *N. Langsdorffii* on the background of the F_1 were studied. It was found that two of the extra chromosomes each caused a decrease in the size of all regions of the corolla, whereas the other two caused an increase in the size of one region and decrease in another."

907. CLAYTON, E. E. and 633.71-2.3-1.521.6:575.127.2
 SMITH, T. E.
Resistance of tobacco to bacterial wilt (*Bacterium solanacearum*).

J. Agric. Res. 1942 : 65 : 547-54.

The testing of *Nicotiana* species for resistance to bacterial wilt was begun in 1934 and continued to 1941. The material consisted of a number of strains of *N. Tabacum*, most of which were from Central and South America, together with a collection of wild *Nicotiana* species. The wild species, of which a list is given, proved susceptible, while a number of *N. Tabacum* strains were more or less resistant. By 1940 these strains had been reduced to a small group. Davis Special is an example of the strains with slight resistance, which, when infestation was mild, showed high resistance, but were completely susceptible when infestation was severe. Genotypes with good flue-cured quality may be valuable for crossing with more highly resistant strains.

T.1.79 and Turkish Xanthi were the best strains with moderate resistance. A cross between them produced 79-X which showed more resistance than either parent.

T.1.448, which was obtained from Colombia, was labelled by the collector as a mixture of Castello negro, Castello blanco and Pina. A strain named T.1.448 A was selected from greenhouse plantings of T.1.448, and appeared highly resistant to both bacterial wilt and mosaic. Early in the summer a large percentage of the young plants often showed wilt symptoms, but the greater majority of these recovered by late summer. Less than 10% of the infected plants died and practically all the deaths occurred early in the summer.

In 1941 infestation was severe. Turkish Xanthi and T.1.79 were greatly affected while 79-X and T.1.448 A showed no more wilt than in 1940. It appeared that both T.1.448 A and 79-X were homozygous for resistance.

* See also Abst. 743.

Unfortunately 79-X is a poor plant type; but a study of the genetic behaviour and pathological reactions indicated that the resistances of 79-X and T.1.448 A are basically different and probably controlled, to a large extent, by different genes, making it possible that a completely resistant genotype could be obtained from the cross 79-X x T.1.448 A.

Numerous F_3 lines from T.1.448 A. x flue-cured, were grown in the field and produced a cured leaf that strongly resembled flue-cured tobacco. Some of these lines possessed the full resistance of the T.1.448 A parent.

908. VALLEAU, W. D. 633.71-2.8-1.521.6:575

Control of the common mosaic disease of tobacco by breeding.

Phytopathology 1942 : 32 : 1022-25.

The incorporation of the best Ambalema-type resistant plants (A) and the *glutinosa*-type resistant plants (N) either separately or together with desirable varieties is shown by the author to be a satisfactory method for the practical control of tobacco mosaic, provided good commercial varieties can be produced with these factors in a homozygous condition. R. M. I.

909. VALLEAU, W. D. 633.71-2.8-1.521.6:575.11

The relative positions of the N and N' factors on *Nicotiana tabacum* chromosomes.

Phytopathology 1943 : 33 : p. 14. (Abst.).

Crosses were made between Burley tobaccos carrying NN, the factor in *Nicotiana glutinosa* that causes local necrotic spots when the plant is inoculated with any so far tested strains of tobacco mosaic virus and N'N' a factor found in *N. Tabacum* which causes a very similar reaction to a few strains of the virus. The F_1 was selfed and back-crossed to both NN and N'N' and the results of inoculation suggested that the N factor of *N. glutinosa* and the N' factor in *N. Tabacum* are allelomorphs. R. M. I.

910. CHENEY, R. H. 633.79(74.7)

China tea substitutes in the New York area.

Amer. J. Bot. Suppl. 1942 : 29 : p. 5s. (Abst.).

More than 25 species hardy in New York could be used as tea substitutes. Their palatability and desirable or undesirable effects on the human organism have been studied.

CONDIMENTS 633.84

911. COULTER, F. C. 633.842:576.16

Story of garden vegetables. XIII. Peppers: native Americans now known the world over.

Seed World 1942 : 52 : No. 10 : 10-11.

The peppers are placed in eight groups. Each group is described and the varieties in the groups are named.

912. BARNES, W. C. 633.842:581.6:575(75.7)

No more hot pods in this pepper. Paprika pepper acreage expands in South Carolina as growers find it outpays cotton.

Sth. Seedsman 1942 : 5 : No. 11 : 11, 35.

By careful selection of the 1941 crop of paprika pepper and by selfing in the greenhouse during the winter, the South Carolina Truck Experiment Station has eliminated all hot peppers from the breeding material. Further breeding will be necessary to produce varieties of uniform pod shape and colour.

OIL PLANTS 633.85

913. BONDAR, G. 633.85(81)

Penão, *Cnidoscolus Marcgravii* Polh. Novo recurso oleifero da Bahia.

(*C. Marcgravii* Polh., a new source of oil in Bahia.)

Bol. Inst. Cent. Fom. Econ. Bahia 1942 : No. 12 : Pp. 16.

The tree, a member of the *Euphorbiaceae*, produces edible nuts resembling the common almond, from which a drying oil suitable for industrial and culinary use is obtained. A botanical description of the species is given, with a discussion of its synonyms, distribution and the methods of utilization.

914. 633.853.74:576.356.5:581.6(87)
 Sesamos con mayor riqueza en aceites. (**Sesame with higher oil content**).
 Ciencia, Mexico, D.F. 1942 : 3 : 173-74.

Plants with reduplicated chromosomes have been obtained by colchicine treatment by Prof. D. G. Langham at the Instituto Experimental de Agricultura y Cría, de Venezuela (El Valle, Caracas). The tetraploid plants produce the normal number of seeds, which are however twice the normal size and have a higher oil content.

915. **DICKEY, R. D.** 633.854.56:575(75.9)
The importance of tung seed selection.
 Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 127-30.
 In 1930 a block was planted of open-pollinated seedlings from two trees, designated tree 2 and tree 9. The 1940 yield records of trees from No. 2 and No. 9 seedlings are considered. 56.9% of No. 2 and 59.4% of No. 9 seedlings were true to type. 12.3% of No. 2 and 15.4% of No. 9 vary from parent type in only one character. Thus only 3.1% of No. 2 and 4.9% of No. 9 were unlike the parents in all of the characters considered. The data support a suggestion by Camp that if propagation by budding or grafting fails, pure line strains of high yielding varieties should be developed.

916. 633.854.56:575.42(73)
BLACKMON, G. H. 633.854.56-1.524
The tung-oil industry.
 Bot. Rev. 1943 : 9 : 1-40.
 The botanical features and various names of the five species of tung (*Aleurites*) are described, with notes on pollination and fertility of this tree, its introduction into the United States and its distribution there and in California in particular. The methods of growing tung and of oil production in China are also recorded. Harvesting processes, soil requirements, pests and diseases, propagation by seedlings and buddings, cultivation and especially the cold resistance of different species are outlined from the results obtained by American workers. The selected material available at the Florida Experiment Station as a possible basis of future named varieties is mentioned. Breeding and propagation of selected clones are still the main problems at the Station. Though not yet named, trees No. 2 and No. 9 are specially mentioned for vigour and prolificacy which appears to be transmitted to the progeny. Research is also in progress at many laboratories in the Southern States of the U.S. The experiments on tung plantations in South America, Russia, New Zealand, South Africa, etc. are also briefly referred to.

917. **ANGELO, E.** 633.854.56:581.162.3
 BROWN, R. T. and
 AMMEN, H. J.
Pollination studies with tung trees.
 Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 176-80.
 Although observations indicate that pollen may be carried by the wind for 100 feet it is unlikely that this method would account for the almost perfect pollination which takes place in an orchard of tung trees. Results show that the flowers are largely insect pollinated. Data are given which show that there is a gradual decline in efficiency of the pollen with age. Pollen from flowers which had been open for one day and the anthers of which had begun to shed pollen, gave the best results in the crosses made.

918. **BEIRNAERT, A.** 633.855.34:575.11:581.6(67.5)
 Le problème de la stérilité chez le palmier à huile. (**The problem of sterility in the oil palm**).
 Bull. Agric. Congo Belge 1940 : 31 : 95-110.
 In spite of the high yielding capacity (a possible 3 tons per ha.) which can be expected from selected *tenera* palms, sterility in trees of *tenera* ancestry may, it has been found, amount to 25% in experimental hybrid or inbred plantations. The complete elimination of these sterile types is the most urgent problem of the breeder. Already the Yangambi Experimental Station has succeeded in producing seed that should yield less than 5% of sterile trees. The genetical basis of this type of sterility, which is found only in *pisifera* palms and is correlated with thickness of the shell (one extreme being the *dura* type and the other the *pisifera*,

or shell-less type) is discussed, with a full explanation of Mendelian inheritance of such a monofactorially conditioned character exhibiting intermediate types in the hybrids.

An analysis of shell thickness in a number of crosses representing various combinations of *dura*, *tenera* and *pisifera* types confirmed the above theory and the genetic factor responsible for the *dura* type is termed C and for absence of shell (*pisifera* type) c its recessive allelelomorph. The view that the *tenera* type represents a stage in degeneration tending towards ultimate elimination of the shell is refuted.

In considering the problem of how best to eliminate sterile types, the merits of the various possible combinations of *dura*, *tenera* and *pisifera* forms and selections in the *dura* or the *tenera* types separately are estimated. From *tenera* x *dura* and *dura* x *tenera* crosses an oil content of about 32%, and complete absence of sterile plants is predicted—the relative advantages of the nuts from these 2 types will be discussed in a later publication—while from *dura* x *pisifera* only fertile *tenera* types would be obtained, with an oil content of about 40%.

Mention is incidentally made of certain rare specimens of *tenera* mother trees which as a rule produce only 15% sterile offspring.

919. VANDERWEYEN, R.

633.855.34:581.162.5

L'élimination des *pisifera* ou stériles dans les palmeraies issues de croisements *Tenera* x *Tenera*. (The elimination of the *pisifera* or sterile forms in the plantations from crosses of *Tenera* x *Tenera*).

Bull. Agric. Congo Belge 1942 : 33 : 114-22.

The progeny of the cross *tenera* x *tenera* is made up of 25% *dura*, 50% *tenera* and 25% *pisifera* and sterile. As the *pisifera* forms are entirely unproductive they should be eliminated and the characters by which they may be identified are described. At 4 years old all trees with a crown of rotten fruit clusters and those with fruits bearing a kernel but no shell can be regarded as *pisifera* and destroyed.

R. M. I.

920.

BONDAR, G.

633.855.37(81)

633.527.4(81)

A piassaveira e outras palmeiras *Attalea*neas na Bahia. (Piassava and other *Attalea* palms in Bahia).

Bol. Inst. Cent. Fom. Econ. Bahia 1942 : No. 13 : Pp. 76.

Palms of the genus *Attalea* are extremely common in the humid coastal areas of Brazil and their many and varied uses are described. These include the manufacture of very high quality active charcoal, the production of crude diesel oil, of piassava fibre and of a healthful beverage. There follows a discussion of the systematics of the genus, with a key for the identification of the species, and of the mode of reproduction. Descriptions are given of the individual species and of the methods of utilizing them, with indications of the local names.

RUBBER PLANTS 633.91*

921.

633.912-2.183-1.521.6(67.5)

Résistance au vent des clones d'hévéa dans la région de Yangambi. (Resistance of *Hevea* clones to wind damage in the Yangambi region).

Bull. Agric. Congo Belge 1941 : 32 : 69-82.

From observations on wind damage to various rubber clones on 10 experimental plantations at Yangambi and Gazi in the Belgian Congo, the writer reaches, among others, the following provisional conclusions:—

Clone Y24/44 is resistant to wind damage; Av.152 and Av.49 very resistant; BD5 moderately susceptible and Tj.1 and Tj.16, Av. 163, M.7. and M.8. very susceptible. Various different reactions of these clones incidental to their proneness or resistance to wind injury and the importance of age as a factor in its estimation are also considered.

922. SORENSEN, H. G.

633.912-2.421.9

Crown budding for healthy *Hevea*.

Agric. Amer. 1942 : 2 : 191-93.

The Ford company began its Latin American rubber work in 1929, using seeds obtained from various regions in Brazil. In 1934 they planted 53 high rubber-yielding strains which were imported from the Far East.

Many of the Eastern clones proved to be highly susceptible to South American leaf blight

* See also Absts 743 and 799.

(*Dothidella ulei*), while many of the seedlings obtained from the area around Belém and the Acre Territory were resistant.

Selection work was begun in order to find mother trees combining good yield and resistance. The large number of selections which have been made since that time are now being rapidly multiplied for planting, and for use in bud grafting disease resistant crowns on to the trunks of susceptible Eastern strains.

Crown budding may be used to speed the production of *Hevea* flowers needed in producing hybrid strains.

Early work was done with *H. guianensis*, *H. spruceana* and other species but it is considered safest to top work only with *H. brasiliensis* in order to avoid possible lessening of the quality of the latex.

While bud grafting is of value for utilizing the imported Eastern clones in the Americas, the ultimate objective of Western Hemisphere plant breeders is to develop strains of *H. brasiliensis* in which very high yield and disease resistance are combined.

923. WARMKE, H. E. 633.913:576.312.35:576.37:581.162.5
Macrosporogenesis, fertilization, and early embryology of Taraxacum kok-saghyz.

Bull. Torrey Bot. Cl. 1943 : 70 : 164-73.

The plants used in this study were from seed flown by air express to the United States from Russia.

The diploid chromosome number was found to be 16, and the haploid number 8.

The development of the macrogametophyte, which was quite regular, and the process of fertilization are described in detail. Fertilization starts about 30 minutes after pollination at 70° F. under greenhouse conditions. Supernumerary male nuclei are not uncommon and some evidence that functional polyspermy may occur in connexion with the endosperm has been found.

The developing embryo had 16 chromosomes and the endosperm 24. Self-sterility is very pronounced except for a certain amount of "end-season fertility, induced possibly by temperature, light, or the age of the plant". Though definite proof that this delayed fertility is due to selfing has not yet been obtained, apomixis is regarded as highly unlikely to be the cause.

The correlation between polyploidy and apomixis in the genus is discussed.

With satisfactory methods of assessing the rubber content the breeding of *T. kok-saghyz* and the selection of suitable strains with improved rubber content should be a routine operation for the experienced plant breeder.

924. WARMKE, H. 633.913:576.312.35:581.162.5:576.356.5
The cytology and breeding behavior of the Russian dandelion, Taraxacum kok-saghyz.

Amer. J. Bot. Suppl. 1942 : 29 : p.19s. (Abst.)

T. kok-saghyz has $n = 8$ and $2n = 16$ and is therefore a basic diploid in the genus. One pair of chromosomes has large satellites. Self-sterility is high. This species shows no evidence of apomixis which is found in the common polyploid members of the genus. Gamete formation and microsporogenesis are normal and a high percentage of good pollen is produced. Selection and breeding experiments to increase rubber content could be undertaken.

925. DOTEN, S. B. 633.913:581.6
Rubber from rabbit brush (Chrysothamnus nauseosus).

Bull. Nev. Agric. Exp. Sta. 1942 : No. 157 : Pp. 22.

Of the twenty or more similar varieties of the rabbit brush (*Chrysothamnus nauseosus*) some have far more rubber than others. Among the individual plants of the same variety there is a great variation in rubber percentage, which makes it possible to breed for plants with more rubber than any of the wild strains.

FRUITS 634*

926. ALDERMAN, W. H. and 634:575(77.6)
 HARALSON, F. E. 634.11:575(77.6)
Minnesota fruit breeding farm. Report for 1941.

Minn. Hort. 1942 : 70 : 106-07, 111-12.

Since its foundation 34 years ago the Station has grown more than 150,000 seedling fruits and

* See also Absts 739 and 741.

has introduced more than 41 new varieties. The Haralson apple, introduced 18 years ago, is rapidly becoming the dominant variety in Minnesota on account of its pleasing quality, attractive colour and high rating for culinary purposes. The Beacon apple is a good early market variety and Prairie Spy is displaying high quality as a winter apple. No. 700, a dark red, high quality late autumn and early winter variety, has been named Minjon; it hangs on the tree well even in very high winds.

Brief descriptions are given of a number of promising seedlings of apples, plums, grapes and strawberries.

927. LINEBERRY, R. A. and
BURKHART, L.

634:577.16

The vitamin C content of small fruits.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 198-200.

Considerable varietal differences are shown in vitamin C contents of strawberries.

Blueberries contain less vitamin C than strawberries and show little varietal difference.

Vitamin C content and varietal differences in raspberries, blackberries and dewberries are higher than in blueberries.

928.

634.11:575(77.3)

The Wrixparent apple.

News Lett. Ill. St. Hort. Soc. 1943 : No. 1 : p. 4.

The Wrixparent apple variety, which ripens ten days earlier and is more spreading and more blight resistant than Early Transparent, and whose light green, good quality fruit, are larger than those of this variety, is recommended for growth in southern Illinois.

The variety was found about 1920 in a Transparent orchard in Delaware and has been propagated by the Bountiful Ridge Nurseries, Princess Anne, Maryland.

Annual crops have been secured from this variety when topworked on Transparent.

929. TOENJES, W.

634.11:575(77.4)

The new Close apple.

Quart. Bull. Mich. Agric. Exp. Sta. 1942 : 24 : 321-22.

Also News Lett. Ill. St. Hort. Soc. 1943 : No. 1 : 2-3.

A description is given of the new Close apple developed by C. P. Close at the U.S. Department of Agriculture when grown at the Graham Station. Among its desirable characters is an early high yield of good quality; also resistance to fire blight infection. The variety is, however, attacked to a greater extent than standard later maturing varieties by apple scab and codling moth. If the mature fruit are left on the tree they must be picked at short intervals.

930. ELLENWOOD, C. W.

634.11:575.061.6(77.1)

Red varieties of early apples.

Bi-m. Bull. Ohio Agric. Exp. Sta. 1942 : 27 : p. 124.

A number of red apple varieties have been tested in order to find one which will meet the demand for a good red apple ripening about the same time as Yellow Transparent.

It was found that the variety Close which is a seedling of Yellow Transparent, resembles this apple except in colour and ripens at the same time. It is recommended for trial. A report is given on the other varieties tested.

931. TODHUNTER, E. N.

634.11:577.16:576.312.35

The nutritive value of apples.

Pop. Bull. Wash. Agric. Exp. Sta. 1937 : No. 152 : Pp. 32.

Wide varietal differences in Vitamin C content are shown by apples. Tables are given which show the Vitamin C content of a number of varieties tested in England and America.

The author states that the chromosome number is unrelated to Vitamin C content.

932. LESLIE, W. R.

634.23:575(71.27)

Manitoba news letter.

N. S. Dak. Hort. 1943 : 16 : p. 16.

The new cherry varieties Dura (test number Morden 116) and Morden 123 (place number U-14-100) which are seedling selections from the sand cherry hybrid Sapa, are described in some detail. They are superior to Sapa in winter hardiness and fruit size. The fruit of both plants is of good quality. The fruit of Dura remains on the tree in an edible condition for over a month, and that of Morden 123 for over two weeks.

933. JOHNSTON, S. 634.25(77.4)
Peach culture in Michigan.
Circ. Bull. Mich. Agric. Exp. Sta. 1941 : No. 177 : Pp. 88.
A description is given of a number of peach varieties which are recommended as standard for Michigan. The origins of some of these varieties are retailed. They are all yellow-fleshed, freestone varieties.
One method of reducing the loss due to winter injury is to grow varieties which are hardy in fruit bud and wood.
Oriental fruit moth larvae (*Grapholitha molesta*) are most injurious on late varieties.

934. 634.25:575(73)
634.711:575(73)
633.289:575(73)

Research work and workers.
Seed World 1942 : 52 : No. 12 : p. 44.
A peach known as Shirin Donak, sent from Russia to the U.S.D.A. and New Jersey Station for testing, has kernels which taste like almonds. The fruits ripen in September and are large and pure white.
The N.Y. State Fruit Testing Association at Geneva has introduced a new red raspberry under the name of Milton. It is a late variety with large berries resembling those of Taylor and is very resistant to mosaic.
Certain bamboo varieties produce more cellulose per acre than any other plant. Tests are being made on the possibility of their introduction on the Gulf Coast.

935. CURREY, E. A. 634.25-2-1.521.6:575"793"
New peach varieties found good in Delta.
Miss. Fm Res. 1942 : 5 : No. 8 : p. 8.
An increasing number of insects and a greater amount of disease has been found in recent years on peach trees and fruit in the Yazoo-Mississippi Delta. Since early varieties are not so badly affected by brown rot or oriental fruit moth injury it has become important to find a good peach variety which ripens two or three weeks earlier than Elberta.
Of nineteen early varieties which are described, Halehaven is the best when collectively judged by the harvesting dates, average bushels per acre and different diameters of the fruit.

936. MORTENSEN, E. and 634.3:581.162:581.165.711
RIECKER, C. R.
Seed production and seedling yields of some citrus varieties of possible value for rootstock purposes.
Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 145-48.
A variety may be resistant to diseases, adaptable to soil and climate, and yet be of little practical use as a stock because of low seed production or slow development of the seedlings.
Results from the estimations of the seed yield per fruit show that the trifoliolate orange is the best, with an average of 45.9%.
Trifoliolate orange and Carrizo citrange are given as the most promising varieties for seed yield per tree.
On October 15th, which is a good date for budding citrus in South Texas, the diameters of seedlings were taken at a point 2 inches from the ground. Those with a diameter above 5 mm. were considered satisfactory for budding and therefore "usable." Carrizo citrange, trifoliolate and sour orange were the best in yield of "usable" seedlings.
Thus Carrizo citrange is the most promising variety of citrus rootstock for the Winter Garden area of Texas. It has a high yield of fruit, good seed production and excellent germination and yield of "usable" seedlings.
The best seedling producers are not recommended for use as rootstocks, but only suggested for trial.

937. LEVITT, J. and 634.3-2.1-1.521.6
NELSON, R. C.
The relative resistance of morphologically different orange-peel cells to various injury factors.
Biodynamica 1942 : 4 : 57-64.
Resistance to the factors high temperature, frost, deplasmolysis and drought proved higher in

epidermal and two or three rows of sub-epidermal cells of the orange peel of June Bloom and Regular Bloom Valencias than cortical cells between the glands, and higher still in the gland cells. It was found that when any one of these groups of cells was considered separately, that it showed equal resistance to each of the above factors.

Since high temperature differs from the other factors in not having a dehydrating effect in the experiments, the parallel resistance of the three kinds of cells to all four factors is somewhat unexpected.

NUTS 634.5*

938. KLINE, L. V. 634.51:581.6
A method of evaluating the nuts of black walnut varieties.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 136-44.

From an examination of various nut features it is concluded that only nut weight, kernel content and cracking quality, are important in determining the nut value from the point of view of hand shelling.

A system has been evolved wherein nut value is expressed in terms of income-producing potentialities and is fully described in the paper.

Data are presented showing the differences in nut development of different trees. It is pointed out that between-season difference is appreciable, which makes evident the necessity of repeated examination of nut crops over a period of years.

The desirability of establishing variety test plantations is shown by data presented on within-variety differences in nut development observed in trees from different locations.

Studies were made on the effect of moisture content in introducing errors in the measurement of nut weight and kernel content. The data indicate that for precise tests moisture content should be determined and the nut measurements adjusted to a common base moisture content. For preliminary work and rapid tests of nut quality, it need not be determined if the nut is well cured.

Twenty-five nuts drawn at random from a representative lot constitute an adequate sample, except when very precise comparisons are required.

939. MANNING, W. E. 634.522:581.45:582
A leaf character for shagbark hickory.

Amer. J. Bot. Suppl. 1942 : 29 : p. 13s. (Abst.).

Leaves of young and mature *Carya ovata* trees are distinguishable from the leaves of all other north-eastern hickories by one or two dense tufts of hairs on the upper part of each serration—usually accompanied by a ciliation of single or fascicled hairs. On seedlings and small saplings the leaf margins are almost uniformly ciliate as in the mockernut, the kingnut hickory and very young pignuts.

940. GUEST, P. 634.57:575.061.633
The relationship between chlorosis of macadamia seedlings and certain chemical constituents of macadamia seeds.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 61-64.

One hundred and twenty macadamia seeds were gathered from each of 22 trees and planted in boxes of washed coral sand. No nutrients were added. The cultures were maintained under field conditions during the seedling stages.

The chlorotic value was estimated and ranged from 1.07 to 3.29. The amount of ash, iron, manganese, potassium and phosphorus, in the seeds from each of the 22 accessions was determined by analysing 20 kernels from each lot of seeds.

The results may be interpreted as showing that as far as iron, manganese and phosphorus are concerned, only iron is significantly concerned with the expression of chlorosis.

941. BATTEN, E. T. 634.58:575(73)
Peanuts go pleasingly plump. Plumper pods are sought in breeding work with Valencia, Spanish, Virginia types.

Sth. Seedsman 1943 : 6 : No. 3 : 11, 34.

Seeds from twenty-one strains, some of which were obtained from commercial sources, were planted in replicated plots for three years. During this period thirteen strains were eliminated

* See also Abst. 739.

on the basis of yield and the required size of the pods and kernels. Progeny of single hills selected from each of the remaining strains, six of which were of the jumbo runner type, two large Virginia Bunch and one small or Carolina Bunch, were developed. In general it was found that high yield resulted in small pods and kernels while plants producing large kernels gave low yields.

The single hill selections continued to behave as pure lines maintaining a very uniform size of pods and kernels.

The 200 or so foreign varieties and strains introduced into the U.S.A. have been reduced to 49 separate plants. These were tested together with some of the best strains of jumbos, bunch and Spanish. A number of the plants were found to produce very high yields of hay as compared with the Virginia and Spanish varieties ordinarily grown in Virginia and some outyielded in nuts the Spanish strain in general use.

It is suggested that some of these foreign plants which combine a relatively high hay yield with a moderate yield of nuts might be grown for feeding purposes. Single hill selection will be made from these newly introduced strains when it has been determined which of them show promise of being of value for local conditions.

942. STEINBAUER, C. E.,
McCOWN, J. McD.,
BATTEN, E. T. and
HALL, E. E.

634.58:575(73)

Performance of some large-seeded and small-seeded peanut varieties and selections in Virginia and South Carolina.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 240-44.

Data are given regarding the performance of a number of promising selections of large-seeded or Virginia type peanut, with "Virginia Station" as standard, and of selections of the small-seeded types such as Spanish and others. The results show that when dusted with sulphur to prevent leaf spot the small-seeded types produced more forage than the large-seeded types and were almost equal in yield of unshelled nuts.

In yield of shelled nuts, which is regarded as the best criterion of productivity, no large-seeded strain outyielded the standard when no sulphur was applied; when sulphur dust was applied the Florence strain of Virginia Bunch appeared superior.

In the small-seeded group several selections were significantly superior to Spanish 18-38, the standard, at Florence, S. Carolina, but not at Holland, Virginia.

OTHER FRUITS 634.6*

943. CONDIT, I. J. 634.63
El olivo. (The olive).
Publ. Agric. Unión Panamericana Washington, D.C. 1942 : Nos. 142-43 :
Pp. 46.

In this general pamphlet on olive growing the author starts with a botanical description of the species and of the types of flowers produced; the modes of reproduction and methods of cultivation are described. Brief descriptions are given of the varieties most commonly grown in California.

The remainder of the bulletin is devoted to the utilization of the crop.

944. P., A. 634.63:582(45)
Congress on olive-growing studies in Italy. 634.63:581.162
Int. Rev. Agric. 1942 : 33 : 304T-07T.

A report on the National Congress on olive growing in Florence, 1942.

Prof. Ciferri explained the basis of a new morphological and ecological classification of the forms of olive grown in Italy. In collaboration with Prof. Morettini, Marinucci and Breviglieri a provisional index of the different varieties has been drawn up on the basis of fruit, leaf and tree characters.

Prof. Breviglieri's report on research on the floral biology of the olive points out that nurserymen should use strains better adapted and more suitable for cross-pollination and fertilization.

Pests, diseases and the cultural and economic aspects of olive improvement were also discussed.

945. SCHROEDER, C. A. 634.653:581.331.2
Pollen germination in the avocado.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 181-82.

Avocado pollen showed no germination in nutrient solutions. Solutions in which other pollen germinated were tried without success. Germination did occur when the pollen was placed on unpollinated and freshly matured stigmas of apple, feijoa, and others and the pollen from these plants germinated on avocado stigmas.

Results were obtained by using a modification of the technique employed by Buchholz and Chandler. The results show that the pollen will germinate even at 40° F. and higher. Such a temperature in avocado growing areas in South California during the bloom period seldom occurs so it seems improbable that low temperature is a factor in germination of this pollen under field conditions.

Avocado pollen was shown to retain its viability for moderate periods of time. The best example is that of pollen from the variety Fuerte which germinated after 153 days storage at 59° F.

946. BAILEY, L. H. 634.71:582(7)
Species Batorum. The genus *Rubus* in North America (north of Mexico).

Gentes Herbarum, N.Y. 1943 : 5 : 231-422.

A continuation of the studies of *Rubus* already reviewed in "Plant Breeding Abstracts". Vol. XI, Abst. 1094. The difficulties of classification and of constructing a suitable key to the species included in the Flagellares are indicated in the introduction.

947. LESLIE, W. R. 634.711:575(71.27)
Manitoba news letter.

N.S. Dak. Hort. 1942 : 15 : 136, 139.

A description is given of the yield and quality of the fruit produced by the red raspberry varieties, Indian Summer, Newburgh, Marcy, Taylor, Latham and Chief, the black varieties Bristol and Dundee, and the purple ones Sodus and Potomac. A number of new cross-bred red raspberries have been obtained from Ottawa and may prove better than the older varieties for prairie plantations.

948. DRAIN, B. D. 634.711:575(76.8)
How new varieties are developed. New Tennessee fruits. Years and much outlay required by station.

Sth. Flor. 1942 : 52 : No. 23 : 5-6.

An account is given of the system adopted by the officials of the Tennessee station to introduce the products of breeding research.

The first patent was taken out on the Tennessee Supreme strawberry which is a high-flavoured brightly coloured variety and valuable for frozen pack and local use.

A plant patent was applied for in 1940 on the red raspberry variety Tennessee Autumn. This is a two-cropper variety, very vigorous, healthy and productive, and combined in it is an oriental, a European and an American species. It does not stand long transportation.

Tennessee Shipper, the latest strawberry variety released by the station, was introduced as a commercial transporting plant. This variety is free from yellows and produces a good sized berry which is retained through the picking season. In other respects it resembles Blackmore. A single cropper red raspberry is included amongst the new varieties of red raspberries and strawberries which will probably be released within a year or two.

949. DARROW, G. M., 634.73:576.312.32
 CAMP, W. H.,
 FISCHER, H. E. and 634.73:575.127.2
 DERMEN, H.

Studies on the cytology of *Vaccinium* species.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 187-88. (Abst.).

The chromosome number of many additional species and varieties of blueberries has been determined. The diploid, tetraploid and hexaploid species are listed in this paper.

Examples are given where species fall into series of diploid and tetraploid forms and also into diploid, tetraploid and hexaploid series. In general the tetraploid species are larger in form, more vigorous and sucker less than their corresponding diploid species. The hexaploids of the material examined have the largest form, most vigour and in one case the plants sucker the least.

No triploid blueberries have been found and one vigorous pentaploid similar to the hexaploid *V. amoenum* was collected in south-eastern Georgia. Vigorous pentaploids similar to this wild species have been obtained by crossing *V. australe* (4x) with *V. Ashei* (6x). The authors have observed that all the resultant seedlings from similar crosses performed by Colville and Freeman were fertile.

Numerous naturally occurring diploid and tetraploid hybrids are mentioned. These hybrids readily back-cross with the parental species. Similar hybrids which have been produced under controlled conditions resemble the wild ones.

The series *V. tenellum* (2x), *V. virgatum* (4x) and *V. amoenum* (6x) and the related *V. Ashei* varieties are drought and heat resistant and are better adapted to upland conditions than the present high-bush varieties.

950. DEMAREE, J. B. and
WILCOX, M. S.

634.73-2.42-1.521.6

Blueberry cane canker.

Phytopathology 1942 : 32 : 1068-75.

Physalospora corticis n. sp. is the name proposed for what is thought to be an undescribed species of *Physalospora* attacking the stems and shoots of *Vaccinium* spp.

Considerable difference in resistance is noted for a number of varieties.

R. M. I.

951. COOPER, W. C.

634.774:581.162:577.17

Effect of growth substances on flowering of the pineapple under Florida conditions.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 93-98.

Pineapple plants under Florida conditions when treated with naphthaleneacetic acid in October showed premature flowering. Those treated in July did not. Ethylene induced flowering at both times.

There were differences between the October and July plants, but these may have been partly due to external conditions.

VITICULTURE 634.8

952. OLMO, H. P.

634.835:576.356.5

Breeding new tetraploid grape varieties.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 225-27.

Of 20 tetraploid *vinifera* varieties grown at Davis, California, the undesirable characteristics that may prevent commercial acceptance are: (a) the shoots have shorter internodes resulting in sparse foliage cover of the fruit; the canes, shoots and cluster stems are all brittle and there is considerable breakage by the vine; keeping qualities of the fruit are poor, as the cluster structure is more succulent and the berries are softer in texture; (b) irregular and poorly set clusters. Most varieties set a smaller percentage of grapes than the corresponding diploid; (c) the total yield per vine is often less.

Tetraploids derived from interspecific hybrids such as Niagara, Catawba and Delaware, do not have such undesirable characteristics as most.

From these facts the authors conclude that the results of the tetraploid condition cannot be predicted with certainty.

This indicates that it is not the mere doubling of the chromosome number which produces the typical features of a tetraploid variety, but the changed genetic balance. Thus the genotype of the particular variety in which doubling occurs plays a large part.

It would appear that some of the desirable features of a tetraploid could be maintained and the defects eliminated by breeding and selection.

The authors have produced numerous triploids that appear to have promise as rootstock varieties because of their great vigour. One tetraploid variety has the appearance of an extremely vigorous diploid, having produced long canes with wide leaves. The berry size of three seedlings is as large as that of the tetraploid parents and in one case larger.

Breeding and selection amongst the tetraploid forms appears promising, with the possible production of varieties with much larger berries, and a vigour hitherto unknown.

953.

OLMO, H. P.

634.835:581.162.5:575.182

634.25:581.162.5

Choice of parent as influencing seed germination in fruits.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 171-75.

The purpose of the paper is to show that poor germination of grape and peach seeds may often be circumvented by the proper choice of the maternal parent. In some cases abnormal development of the embryo sac, seed coats or nucellus, prevents fertilization. In others, fertilization takes place and yet the seeds show low germination and it matters little as to the choice of the pollen parent.

Many grape varieties have seeds in which the integuments fail to develop normally and there is a cessation of endosperm development. The seeds are hollow at maturity and seldom germinate. Pearl of Csaba, when self-pollinated, or crossed with other varieties, yields less than 2% of viable seed when used as the maternal parent; if the pollen is used on another variety of high germination capacity, for example Champion, many hybrid seedlings will be obtained. Data of results of other crosses show that the best seed germination is obtained by using the variety with the highest seed viability as the maternal parent.

Similar results are obtained with the peach. Lammerts has shown that the production of a lower percentage of aborted embryos can be brought about in a similar manner.

The fact that self-fertilized seeds are less viable than cross-fertilized would indicate that the hybridity of the endosperm or embryo is of some importance. But in examples of low seed viability it is apparent that this condition is controlled to a greater extent by the maternal tissues. The abnormal growth or nutritional relationships associated with low seed viability, complete absence of germination or seed abortion are genetic in nature. The genetic control by the maternal genotype appears to be the result of independent gene mutations.

954. OLMO, H. P.

634.835:581.331.2:578.08

Storage of grape pollen.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 219-24.

Since it is possible to store grape pollen for considerable periods by regulation of the temperature and humidity the author discusses the possibility of setting up a "pollen bank".

Tests were made on storing pollen at different temperatures and the results are given.

The three varieties used all showed the greatest longevity at a temperature well below freezing and at the humidity of 28%.

Seedlings grown from the use of 3-year old pollen are reported to appear equal in growth and as normal as those hybrids produced from fresh pollen.

955. MASSEY, A. B.

634.835-1.524

Native grapes of Virginia.

Proc. Va Acad. Sci. 1940-1941 (1941) : 2 : p. 179.

One species of native grape, *Vitis labrusca*, has given rise to a number of cultivated varieties. Wild animals feed on the fruits of the native varieties which are functionally male or female. The seven native species which occur in Virginia are listed.

FORESTRY 634.9

956.

DUFFIELD, J. W.

634.97:575:576.312

634.97:576.356.5

The cytological basis of forest tree improvement.

J. For. 1942 : 40 : 859-64.

An outline is given of the principles of cell division, of different forms of apomixis, and of the phenomenon of incompatibility and various ways of overcoming it. The importance of chromosome number in forest tree breeding is pointed out, and the greater growth rate and disease resistance of triploid poplars as compared with the diploids is used to illustrate the merits of polyploids. While not disguising the various disadvantages of polyploidy, the author suggests a number of lines of improvement that might be attained by the production of polyploid forms; one of the most promising is considered to be the production of fertile amphidiploid interspecific hybrids.

957. SYLVÉN, N. 634.972:575(48.5)
 Årsberättelse över föreningens för växtförädling av skogsträd verksamhet under år 1941. (Annual report on the work of the Association for Forest Tree Improvement during the year 1941).
 Svensk PappTidn. 1942 : 45 : 404-09, 519-22, 542-43.

In 1941 again seed production was poor, most of the ashes selected as mother trees giving none. The elm species crosses of 1939 were repeated in greenhouses with controlled illumination at Ekebo. Only one species cross, *Ulmus campestris* x *U. laevis*, gave any plants; the others failed even to produce mature seed. Some plants were, however, obtained from crosses between *U. glabra* from various localities. Crosses are to be continued next spring.

Seedlings have been planted out from Prof. Turesson's North American collection and the foreign seedlings that are being grown now include oak, ash, birch, alder and elm.

In 1941 *Larix* crosses were carried out at Grensholm and Svalöf, whilst at Kiviks Esperöd crosses within the genera, *Abies*, *Picea*, *Pinus*, *Pseudotsuga* and *Chamaecyparis* were made with satisfactory results, and mature seed has been obtained from crosses of *Larix*, *Picea*, *Abies* and *Chamaecyparis*. It is too early yet to decide whether the interspecific *Pinus* crosses have been successful or not.

At Ekebo the Chromosome Laboratory has been working mainly on colchicine treated aspen, birch and alder, but also of spruce and pine. In connexion with the tree improvement work many determinations of chromosome number have been made. Helge Johnsson's work on chromosome number in *Populus tremula* (cf. "Plant Breeding Abstracts", Vol. XIII, Abst. 338, and Vol. XII, Abst. 212) and in *Carpinus betulus* has been completed, and similar determinations have been made for twin birches. The Laboratory has also been used for work on botanical problems of an anatomical and physiological nature.

The Chemical Laboratory at Ekebo has been engaged upon examinations of the timber from diploid and triploid aspens from both Skåne and Västerbotten. The triploids had all larger cells than the diploids and also showed higher values for cellulose content, though it is possible that these results may be due not to a really higher cellulose content but to the analytical technique employed.

Numerous fibre measurements were also made on conifers and deciduous trees mainly to find out where on the stem samples must be taken if comparable values are to be obtained. Similar work was done by E. Runquist on timber from two species of birch.

Preliminary investigations were also begun on variation in the content of tanning substance in the oak.

Some analyses of woods from *Larix sibirica*, *L. leptolepis*, *L. decidua* and *L. kurilensis* were also made and differences in the chemical composition of the species were recorded.

Studies of nectar secretion in willows, maples and limes revealed constant individual differences in the amount of nectar produced.

The low temperature laboratory completed experiments on oak, beech and ash with reference to coloration or fall of the leaf at various autumn stages and the results will soon be published. E. Runquist reports as follows on the work of the affiliated branch institutions in Norrland:—Seed collected for the study of heritable variation and stand analysis in the pine has been sown at Bosundet in Ångermanland. Germination studies of pine and spruce have been continued and the development of the seedlings obtained is being observed.

In Värmland, Dalarna, Ångermanland and Västerbotten material taken from selected pines from Professor Turesson's collection is to be used for grafts and cuttings which may ultimately be used for crosses of various kinds.

Some comparative data collected in the now 5-year old trees in the pine progeny trials indicated that differences existed in the rate of growth.

Special attention is being given also to Norway spruces and the collection of seed from valuable types, e.g. such as the comb spruce type.

Aspen material from selected parents has been collected for hybridization and some aspens of particularly good quality have also been found in various districts and will be used at Ekebo in crosses.

Comparative observations on birch are being carried out in Värmland, Dalarna and Västerbotten.

In the Dalfors and Orsa region various birch types have been selected for interspecific hybridization. Much attention is being devoted to quality and selections of veneer birch for special

purposes have been made on the basis of purely botanical features in the first instance and the external descriptions drawn up were used as the basis of quality estimates in connexion with turning operations in the plywood factory at Ljusne.

Following up the work of the Norrland affiliated concerns, the Association began in 1941 an investigation of the wood quality of the Northern and Central Swedish birch and a circular on a technique recommended in sending in experimental samples has been sent to all likely to collaborate in this investigation.

F. von Schantz reported as follows on the Central Swedish affiliated bodies:

Selection of seed from promising phenotypes, including pine (103 mother trees) and Norway spruce (185 trees), was continued in a large number of localities and at Ekebo about 33,500 pine and 185,000 spruce seedlings have been raised from comparative trials.

The species of *Larix* situated at Grensholm in Östergötland were used in hybridization experiments and 40 different combinations, involving *L. decidua*, *L. leptolepis*, *L. sibirica* (from Raivola and the Urals), *L. dahurica*, *L. koreensis*, *L. kurilensis*, *L. Principis Rupprechii* and *L. occidentalis*, were made and 160 cones were produced.

Hybridization of pine was also tried at Lunnaby but was only partially successful owing to the scanty flowering of the trees.

Many new experimental plantation plots, including some with American and Swedish oaks, were laid out. A comparative trial of 5,000 American pines begun at Strömserum with *Pinus resinosa*, *P. strobus*, *P. Banksiana*, *P. ponderosa*, *P. contorta* and *P. silvestris* had to be concluded in 1942 owing to drought injury which affected the *P. resinosa* seedlings particularly badly. Minor provenance experiments were conducted at Strömserum, Lunnaby and Grensholm with *P. resinosa*, *P. monticola*, *P. strobus*, *P. contorta*, *P. Banksiana*, *P. ponderosa* and *P. Jeffreyi*.

Selected pines and spruces were chosen for vegetative multiplication by grafts and cuttings. Seed was gathered from birches selected the year before. (Cf. "Plant Breeding Abstracts", Vol. XIII, Abst. 608).

958. LITTLE, E. L. (jun.) 634.972.1:575.12:582

New names in *Quercus* and *Osmanthus*.

J. Wash. Acad. Sci. 1943 : 33 : 8-11.

New names for four natural hybrids in *Quercus* are: x *Q. asheana*, the Ash oak, x *Q. burnetensis*, the Burnet oak, x *Q. cravenensis*, the Carolina oak and x *Q. filialis*, the Varileaf oak. Indications are given of the parents and of earlier homonyms.

959. SNOW, A. G. (jun.) 634.972.2:581.165.72:575.22

Sex and vegetative propagation.

J. For. 1942 : 40 : 807-08.

The ability of red maple trees to root from cuttings was on the whole greater in male than in female trees, though differences between clones occurred in the trees of both sexes.

960. DAVIS, S. H. (jun.) 634.972.3-2.48-1.521.6(73)

Poplar canker. A note on the susceptibility of various poplar species.

Morris Arbor. Bull. 1942 : 4 : p. 28.

A note recording the resistance of 19 species and varieties of poplar in the Morris Arboretum nursery to *Dothichiza* canker. *Populus alba nivea*, *P. alba Richardii*, *P. brevifolia*, *P. euphratica*, *P. generosa*, *P. Maximowiczii*, *P. tomentosa*, *P. trichocarpa* and *P. Geneva* showed no cankering.

961. GRAVES, A. H. 634.972.4-2.421.9-1.521.6:575

Breeding for development of a timber type of disease-resistant chestnut.

Phytopathology 1943 : 33 : p. 18. (Abst.).

*F*₁ hybrids of the blight-resistant but low Japanese chestnut, *Castanea crenata* and the susceptible but tall American variety *C. dentata* were tall but not completely resistant. Some of the *F*₂'s now five years old seem likely to be both tall and resistant.

R. M. L.

962. SCHRAMM, J. R. 634.973-2.4-1.521.6

An experiment in greenhouse benches.

Morris Arbor. Bull. 1942 : 4 : 25-26.

The wood of *Robinia pseudoacacia* is specially recommended for greenhouse benches for which

it is regarded as likely to be particularly suitable owing to its durability and strength. Varieties, races and clones of black locust are recognized as differing in resistance to decay. The Shipmast Locust (*Robinia pseudoacacia* var. *rectissima*) has been used as the material for benches at the Morris Arboretum, where it is hoped future records will justify the experiment.

963. COOK, D. B. 634.975:575.127.2

Characteristics of Dunkeld larch and its parent species.

J. For. 1942 : 40 : 884-85.

The Dunkeld larch (*Larix eurolepis* Henry), a hybrid between Japanese and European larch, is exceptionally vigorous and resistant to diseases and pests. Some third generation seed of the hybrid was planted together with the parental species in New York state. Variation was observed in all three, the hybrid exceeded the taller parent in height at the end of 5 years.

964. EKLUNDH, C. 634.975:575.127.2:576.312.35

Artkorsningar inom sl. *Abies*, *Pseudotsuga*, *Picea*, *Larix*, *Pinus* och *Chamaecyparis*, tillhörande fam. *Pinaceae*. (**Species crosses in the genera *Abies*, *Pseudotsuga*, *Picea*, *Larix*, *Pinus* and *Chamaecyparis* belonging to the family *Pinaceae*.**)

Svensk PappTidn. 1943 : 46 : 55-61.

A detailed and extensive review of records from many Scandinavian and other sources of natural or artificial, interspecific hybrids within the various specified genera of conifers. The results of conifer crosses made at Kiviks Esperöd in Skåne and at Svalöf are recorded in useful tables.

On the subject of some combinations involving *Omorica* Villk. and other sections of *Picea* that have been regarded as impossible or very difficult to cross judgment must be postponed till further work has been done.

Apparently no hybrids of *Chamaecyparis* are known—though in the tables a few seeds are recorded as having been obtained from species crosses in this genus.

Our knowledge of chromosome numbers of conifers and the cytological basis of hybrid species formation in the group is briefly reviewed.

965. MIROV, N. T. 634.975:575.127.2:578.088

Possibility of simple biochemical tests for differentiation between species of genus *Pinus*.

J. For. 1942 : 40 : 953-54.

The oleoresins of many species of conifer have distinctive characteristics. Thus Jeffrey pine contains heptane and no terpenes, ponderosa pine contains terpenes and no heptane. Their hybrids contain both. The refractive indices of the oil from the different species and the hybrid are also different. The fact that certain aldehydes are present in the Jeffrey pine and absent in ponderosa led the author to devise a colorimetric method of distinguishing between the two; a single drop of oleoresin of Jeffrey pine gives a dark purple coloration with Schiff's reagent and ponderosa pine resin remains colourless.

966. RIKER, A. J.,

KOUBA, T. F.,

BRENER, W. H. and

BYAM, L.

634.975-2.452-1.521.6

White pine selections tested for resistance to blister rust.

Phytopathology 1943 : 33 : p. 11. (Abst.).

Pine grafts and pine seedlings in large numbers have been planted in a white pine blister-rust area in Wisconsin and are being tested with both natural and artificial inoculation. R. M. I.

VEGETABLES 635*

967. COOPER, J. F. 635:575(75.9)

Florida crops "styled" to modern design. New disease-resistant strains, developed to meet state's requirements, gain favor with growers and consumers.

Sth. Seedsman 1943 : 6 : No. 1 : 13, 16-17.

Dr G. R. Townsend of the Everglades Experiment Station at Belle Glade is crossing

* See also Absts 736, 738-9, 758, 762, 767, 773 and 832.

commercial bean varieties with mildew and rust-resistant varieties and selecting promising strains.

He is also testing and selecting varieties tolerant to bacterial blight.

At Bradenton selection is being made from segregating material of lima bean varieties suitable for autumn production in Florida.

The Imperial 44 strain of crisp-head lettuce withstands high temperature without bolting and is recommended for Florida. In some areas Imperial 847, which produces larger and better formed heads, is apparently more desirable.

At the Florida Station's Hastings laboratory, many rounded-headed cabbage varieties are being tested for adaptation to Florida.

Blacklee, Hawkee and Stonlee melon varieties are being tested for Fusarium wilt-resistance at the Florida Station's Lessbury laboratory and it seems that they may prove of greater commercial value than the existing resistant varieties.

Three new tomato varieties Newell, Rub Queen and Cardinal King were developed at the Station's Bradenton laboratory. They are all resistant to Fusarium wilt and produce good quality fruits of fair size. Newell, which is a mid-season autumn variety and has yielded fairly well in spring plantings, is stated by growers to be the best of the three.

A blight resistant pepper, a downy-mildew resistant cantaloupe and a large-podded Little Marvel Pea are on trial. Efforts are being made to develop egg-plants with resistance to tip-over disease, and satisfactory spineless okras.

The African squash yields heavily, keeps well and is excellent for table use or forage.

968. WINTER, F. L. 635:575:578.08(73)
"Indispensables" of the seed industry. Breeders and research workers shoulder responsibility of keeping highly-bred varieties true to type and acceptable to customers.

Sth. Seedsman 1943 : 6 : No. 1 : 12, 40-41.

The methods by which vegetable seed stock and cross pollinated crops may be maintained are described. An account is given of the means of creating new varieties with certain important characters and of the evaluation of seed vitality.

The value of research to growers and the staff needed in a breeding establishment are discussed.

969. 635-1.531.12
Restrict vegetable varieties. Seedsmen accept voluntary program to cut down on number of varieties as a war measure. USDA asks help of whole trade.

Seed World 1943 : 53 : No. 1 : 12-14.

A list of vegetable varieties is given in which it is recommended that seed production be concentrated to the fullest extent.

970. DAVIS, G. N. 635.25:581.6:575(73)
"It's a natural" for the onion grower. Mild flavor and higher yields of Early Grano make it increasingly popular with trade and consumers.

Sth. Seedsman 1943 : 6 : No. 2 : 11, 31.

Seeds of an onion variety named Valencia Grano 9452 were imported from Spain in 1925 and grown in New Mexico. Selections were made to improve the shape of the bulbs in subsequent generations and in 1931 the name Early Grano was proposed for the variety. It is also known as Babosa, Earliest Express, Early Sweet Spanish, Early Yellow Babosa and Express Globe. Many selections have been tested in different onion growing districts of the United States to determine the best possible strain for each locality.

The bulb of this onion variety, which is yellow in colour, is described in some detail.

Early Grano outyields the varieties Yellow Bermuda and Crystal Wax and is as early maturing and as well adapted to the same regions and uses as these varieties. It also shows promise in such widely separated regions as Canada and South Texas, where it has become outstanding because of its freedom from splits, doubles and seeders and its ability to withstand attack by thrips.

The variety is more susceptible to pink rot disease than are the Bermuda varieties and does not keep well in storage.

Selections from a white type of Early Grano named Crystal Grano, developed for Californian

conditions, are being made at Texas Agricultural Experiment Station, to obtain an earlier and more uniform maturing strain. Crystal Grano appears to require a longer exposure to daylight than Early Grano, making it somewhat later maturing. Another white type named White Grano has been developed at New Mexico in the same way as Early Grano. White Grano differs from Crystal Grano in having a darker green foliage, but resembles it in season of maturity. Some bulbs of this plant are likely to have a straw colour never seen in Crystal Grano.

971. HANNA, G. C. 635.31-1.557:575
Correlation studies of asparagus comparing yields of various shorter periods with ten-year yields.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 321-23.

A breeding programme was started in 1929 to improve the yield of asparagus. Plants were selected on the basis of number, size, colour, cross section, and smoothness of summer stalks and tightness of the head as indicated by the height of branching. The plants were considered to be outstanding in 3 or more of these characters but not in all 6.

Data presented show a correlation between yields at the end of 3-year and 5-year periods with the yield at the end of ten years when all plants were compared.

It is shown that a number of plants in the high yielding group at the end of 10 years gave relatively low yields during the early years, and some of the high yielding plants the first few years were either dead or poor yielding at the end of 10 years.

An examination of individual plants during the 6 to 8 year period shows that many plants have declining yields while others have increasing yields, which suggests that this is the critical period. Consequently it becomes unsound to make selections based upon total yields alone. The slope of the yield curve on the higher yielding plants appears to offer a better index for selection during this period than during the earlier life of the plant.

The author remarks that one might suppose the number of buds on a plant to be a reliable index of yield, but the experiments show that there is no material difference with regard to this character between the high and low yielding groups.

It is suggested that low yields may be due to a higher proportion of the buds remaining dormant.

The data support Young's conclusion that careful selection of crowns at the time of planting will not eliminate all the poor yielding plants.

As Currence and Richardson have pointed out, only a progeny test will reveal whether or not the high yielding ability is hereditary.

972. MYERS, C. E. 635.34:575.125
The Penn State Ballhead cabbage. Some problems encountered in its development.

Bull. Agric. Exp. Sta., Pa 1942 : No. 430 : Pp. 52.

MYERS, C. E.

Story of a variety. A biographical sketch of Penn State Ballhead, one of the few varieties of which the complete history can be traced.

Seed World 1942 : 52 : No. 9 : 10-11, 36.

An account is given of the development by the author of the variety, which has a high yield and good storage qualities.

The production of seed in the greenhouse is described.

The respective advantages of inbreeding by line breeding or by bud pollination, are discussed. Since cabbage is an open-pollinated plant similar to corn, though probably less mixed, an attempt was made to improve the quality of the plant by crossing inbred lines. Five crosses were made and the yields obtained were compared with those of one or both of the parents line bred for two to four generations. It is shown that the yield of the cross was, in every instance, greater than that of either parent. The average difference per acre between the cross and the higher yielding parent was 5.8 tons.

The methods of testing various selections and substrains are described.

973. NUGENT, T. J. and 635.41-2.484-1.521.6(75.5)
 COOK, H. T.
Developing a wilt resistant spinach variety for Virginia.

Proc. Va Acad. Sci. 1940-1941 (1941) : 2 : p. 182.

In 1936 *Fusarium* resistant plants were selected from a severely infected field of Virginia Savoy spinach, and seeds from these plants were sown in the same field in the early autumn of 1937. Further selections were made for resistant plants. The same procedure was followed in 1938 and 1939. By 1940 a strain had been obtained with which there was only 30% loss as compared with 67% in a regular commercial strain of the same variety.

974. THOMPSON, R. C. 635.52:575.127.2:576.356.5
Further studies on interspecific genetic relationships in *Lactuca*.

J. Agric. Res. 1943 : 66 : 41-48.

69 crosses, of which 25 were reciprocal, were attempted between 8-, 9- and 17-chromosome species of *Lactuca*. Only 8 of the 44 interspecific matings resulted in hybrids. All these hybrids were self-sterile except those from the cross between the two 8-chromosome species *L. bourgaei* and *L. marschallii*. The hybrids from the cross *L. spicata* (17) x *L. bourgaei* (8) had not produced flowers nine months after germination. The other hybrids obtained were from the crosses *L. tatarica* (9) with the two 8-chromosome species *L. bourgaei* and *L. cretica*, *L. canadensis* (17) crossed by *L. bourgaei* (8), *L. graminifolia* (17) with the two 8-chromosome species *L. bourgaei* and *L. floridina* (17) crossed with *L. marschallii* (8).

Thus the results reveal the compatibility of the chromosome complements of certain of the 8-chromosome species with one of the 9-chromosome species and of four of the 17-chromosome species. Probably the most important fact demonstrated is the compatibility relationship shown to exist between the 9-chromosome species *L. tatarica*, a member of the *indica* group, and the two 8-chromosome species *L. bourgaei* and *L. cretica*. These last two species are generally classified in separate sub-genera, *Mulgedium* and *Serriola*, respectively.

Although the *F*₁ hybrids of *L. tatarica* (9) with the two 8-chromosome species were in both cases completely self sterile, they behaved quite normally until after flower production, which shows that the genomes of at least these 8- and 9-chromosome species of *Lactuca* are compatible enough to function harmoniously throughout somatic development.

Detailed evidence is presented to show that the *Serriola* group to which the cultivated form *L. sativa* belongs, constitutes a compatibility group not closely related to the other groups of species studied.

The fact that hybrids were obtained by crosses between the 8- and 9-chromosome species presents further evidence in support of the hypothesis that the 17-chromosome species have come into existence through hybridization between 8- and 9-chromosome species; should some condition cause chromosome doubling in the 8- and 9-chromosome species hybrids, an artificial 17-chromosome form would result. It is not suggested that the species which give rise to the two hybrids in question are necessarily the forms which have entered into the origin of the 17-chromosome species; moreover, neither of these hybrids closely resembled any of the 17-chromosome species with which the writer is acquainted.

975. WHITAKER, T. W. and 635.61-2.421.1:576.16:631.521.6
 PRYOR, D. E.
Genes for resistance to powdery mildew in *Cucumis Melo*.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 270-72.

Through a series of crosses and back-crosses of commercial varieties the gene for resistance to Cantaloupe powdery mildew was incorporated into a genotype with desirable horticultural and market qualities. The variety was named Powdery Mildew Resistant Cantaloupe No. 45.

In 1938 powdery mildew symptoms appeared on vines in fields planted with this variety. Studies were initiated to determine the nature of this "new" mildew. They gave evidence of a new biological race of *Erysiphe cichoracearum*.

Jagger and Scott indicate that a single dominant gene is responsible for the resistance of the No. 45 variety. This gene originated with the material imported from India in 1927.

The authors have discovered a strain that is resistant to both races, and arose from the same source as the No. 45 variety.

Germination of Cantaloupe seeds 10 years old or over is very poor. Of the original material, three seeds germinated but only one survived, and this was susceptible to the second race. Since the original seed from which the No. 45 variety was derived did not germinate, tests had to be made on a later generation. Five plants from a selection made in 1935 were grown in the field and found to be free of mildew. These tests seem to indicate that in the sister line to No. 45 genes for resistance to both races have been inherited from the original source.

The authors give the following points: The practice of carrying forward a number of lines from the original material is justified on the ground that a few will contain a full complement of resistant genes. It is advisable to collect the pathogen from a wide range of localities in order to determine the reaction of desirable material to as many biotypes as possible. It is important to obtain and maintain collections of material from areas in which the host species is endemic. Emphasis is laid on the importance of vigorous testing of the material in the greenhouse and in the field.

976. PRYOR, D. E. and
WHITAKER, T. W. 635.61-2.421.1-1.521.6:578.08

The reaction of cantaloupe strains to powdery mildew.

Phytopathology 1942 : 32 : 995-1004.

A comparison of the reaction of cantaloupe melons, inoculated with powdery mildew (*Erysiphe cichoracearum* DC.) and grown in the greenhouse, with the same varieties grown in the field, showed that inoculation in the greenhouse was a more reliable method for the selection of susceptible strains and that thereby much time and labour might be saved. R. M. I.

977. WHITE, O. E. 635.615:576.16
635.615:575.127.2
Genetic studies on wild and cultivated watermelons (*Citrullus*).
Proc. Va Acad. Sci. 1940-1941 (1941) : 2 : p. 183.

The water-melon is considered as having originated from certain wild types present to-day in Tropical and S. Africa.

The writer concludes from his own studies that the domesticated water-melon is a mutation from the bitter water-melon. He believes it was distributed in early times through the primitive S. African tribes' contact with the Portuguese, who brought it to Brazil, from whence it was eagerly taken up by the American Indian tribes. The author has obtained crosses between colocynths, citrons, and these wild melons, which may throw further light on this subject.

978. COOPER, J. F. 635.615-2.484-1.521.6(73)
634.75:575(73)
Exit fusarium wilt, the villain; enter Blacklee, the watermelon hero.
Sth. Seedsman 1943 : 6 : No. 2 : 18-19, 30.
Research work and workers.
Seed World 1942 : 52 : No. 10 : p. 36.

A new hybrid water-melon named Blacklee, which is 80% fusarium wilt-resistant, has been developed at Leesburg A.E.S. by crossing Leesbury with Hawkesburg. The melon is dark green, long, rather thicker than Tom Watson, weighs around 36 pounds, has dark brown seeds stippled with black, red flesh and a good sugar content. Blacklee has proved quite resistant to sunburn and some strains can stand excessive rainfall. The best strain of Blacklee produces especially high quality, good keeping fruit which have tough rinds.

In the second paper it is mentioned that a new strawberry variety which was named Red Star has been produced at the University of New Hampshire. It is high-yielding and matures a week later than Howard 17.

979. COOK, H. T. and
NUGENT, T. J. 635.615-2.484-1.521.6(75.5)
Developing wilt resistant watermelons for Virginia.
Proc. Va Acad. Sci. 1940-1941 (1941) : 2 : p. 182.

After tests begun in 1934 to obtain suitable wilt resistant varieties three varieties, the Klondike R7, Leesburg and Hawkesbury, were recommended for use in 1938. The Blue Ribbon variety is being distributed this year for trial by growers. A number of hybrids developed by the station are being tested under commercial conditions this year. Attempts are being made to breed for resistance to both wilt and anthracnose.

980. HALTERN, F. V. 635.615-2.484-1.521.6:575(75.8)
No more bad years for watermelons. New wilt-resistant variety developed at Georgia A.E.S.
Sth. Seedsman 1943 : 6 : No. 1 : p. 10.

A new (*Fusarium*?) wilt-resistant water-melon named Georgia Wilt Resistant, has been

produced at the Georgia Experiment Station in co-operation with Georgia Coastal Plain Experiment Station, by crossing Cuban Queen with a wilt resistant melon which was probably an early strain of Iowa Belle. In general appearance the hybrid resembles Stone Mountain but has a slightly tougher rind and promises to transport well. General observations indicate that the yield is the same as that of Cuban Queen. The largest of these melons weighed 20 to 30 pounds. The hybrid has a good eating quality and the sugar content is higher than that of the majority of other strains of varieties grown in Georgia. The seeds are large and grey. The hybrid is not immune to wilt and the fruits tend to be slightly burnt by the sun if they are left in the field after ripening, or if leaf diseases cause early defoliation.

981. BURR, H. S. 635.62:575.061.1:538
Potential differences and fruit form in cucurbits.

Amer. J. Bot. Suppl. 1942 : 29 : p. 4s. (Abst.).

Using electro-metric methods that have been already applied in the study of the amphibian egg, the problem of relationship between the electro-potential field and pattern of organization in living systems is here investigated in the ovary of races of *Cucurbita Pepo*. Preliminary results suggest a significant relation between the field forces in the fruit and the form it ultimately assumes.

982. CURTIS, L. C. 635.62:575.125
Yankee hybrid summer squash. An early, productive first generation cross.

Circ. Conn. Agric. Exp. Sta. 1942 : No. 152 : 61-65.

A first generation yellow, straightneck summer squash hybrid named Yankee Hybrid has been obtained by crossing Early Prolific Straightneck with C.10, a station inbred. Although Yankee Hybrid does not significantly out-yield Early Prolific, it produces more numerous fruits during the early growing season. The fruits of the hybrid, which are not pure yellow but have faint stripes of brighter yellow, are larger in size than those of Early Prolific. It is pointed out that Yankee Hybrid is the first reported case of hybrid vigour in squash, as measured by the production of early fruit and is the only first generation hybrid seed, other than maize, which is being produced on a large commercial scale. It would appear that Yankee Hybrid Squash is adapted to all parts of the country. The production of the seed and the precautions to be observed are described.

983. "Naked" squash seeds better than peanuts. 635.62:581.48:575
 Sth. Seedsman 1943 : 6 : No. 2 : p. 37.

Different types of squash seeds have been produced at the Connecticut A.E.S. to withstand all weather conditions.

It is suggested that naked seeds could be incorporated into a baking squash, and so give the seeds an economic value.

984. BEATTIE, W. R. 635.63-2.8-1.521.6(73)
Cucumber growing.

Fmr's Bull. U.S. Dep. Agric. 1942 : No. 1563 : Pp. 25.

The varietal differences are given of certain white-spined varieties and one black-spined variety of cucumber.

The resistance to mosaic disease possessed by Shamrock has been confirmed.

985. REYNARD, G. B. and 635.64:577.16:575.127.2
 KANAPAUX, M. S.
Ascorbic acid (vitamin C) content of some tomato varieties and species.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 298-300.

Two small-fruited species *Lycopersicon peruvianum* and *L. pimpinellifolium* averaged the highest vitamin C content of the types examined. Figures are given for the vitamin C content of representatives of these species. *L. esculentum* var. *cerasiforme* and *L. esculentum* f. *pyriforme*, which were intermediate in fruit size, showed considerable variation in vitamin C content. The commercial varieties showed the lowest values of any group. In each grouping in which there was a range of several volumes, highly significant negative correlations were shown between vitamin C content and volume.

First generation hybrids resulting from 11 crosses between small-fruited plants with a high vitamin C content and large fruited with a low content, were intermediate both in size and content. In 6 crosses between lines similar in these two characters the first generation plants showed little difference from the parents. Determinations on each of 166 second generation plants from a Red Currant tomato x Marglobe cross showed that the vitamin C content in the F_2 ranged from about 9 to 42 milligrams per 100 grm. fresh weight, the parents having 42 and 16 milligrams respectively. There was a significant negative correlation in the F_2 between volume and vitamin C content.

986. MILLER, J. C. 635.64:581.143.26.035.1:575
New breeding theory is boon to southland. Length-of-day experiments result in prolific "Dixie" tomato and explain shortcomings of many northern-bred varieties.

Sth. Seedsman 1942 : 5 : No. 12 : 7, 35.

Varieties are now being bred which are suited to the ecological conditions prevailing in the area in which they are to be grown.

Photoperiod plays a major part in influencing the vigour of the plant. Most varieties of tomatoes are intermediate in season and can be grown in the extreme North or South; but their yields would be inferior to those of varieties bred for either of the two extremes. Bounty and Bison are well adapted to the far Northern areas, but they are of no value when grown in the South. Dixie and other Southern varieties become extremely vegetative when grown in the North, whereas in the South the plants have great vigour and high yields. Thus breeders desiring early maturing varieties should go North to procure breeding stock. If they require more vigorous but later maturing plants they should go South.

Temperature and altitude also seem to have some control on the vigour of a plant.

987. HOWLETT, F. S. 635.64:581.162.3:577.17
Fruit set and development from pollinated tomato flowers treated with indolebutyric acid.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 277-81.

Flowers of potted tomato plants were treated with 0.3% indolebutyric acid in lanolin emulsion or paste.

The extent of improvement in set brought about by the treatment depends upon the effectiveness of pollination and fertilization since, as the season advances, the pollen is more readily distributed, a greater proportion is viable, more pollen tubes reach the ovary and more seeds are produced.

The flowers showed an acceleration of development following treatment.

Fruits from treated flowers always showed the locules well filled with seeds.

988. CURRENCE, T. M. and 635.64:581.162.32
JENKINS, J. M. (jun.)
Natural crossing in tomatoes as related to distance and direction.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 273-76.

Tests were made in order to determine the effect of distance between plantings of different varieties and direction of prevailing winds upon the percentage of natural crossing.

Increasing the distance by 6 feet row intervals between plants reduced the amount of crossing. Exposure, wind direction or other conditions, may have some effect.

989. HAMMER, K. C. and 635.64:581.6:575
MAYNARD, L. A. 635.64:577.16
Factors influencing the nutritive value of the tomato. A review of the literature.

Misc. Publ. U.S. Dep. Agric. 1942 : No. 502 : Pp. 23.

The portion of this review which deals with the effect of heredity reports that, along with other workers, Tripp, Satterfield and Holmes found that variations of vitamin C content were correlated with different varieties. Currence states that he found no such correlation.

Shivrina reported that it was possible to increase the vitamin C content by breeding. San-some and Zilva found twice as much vitamin C in tetraploid plants as in their diploid parents. Key after doing the same work states that she found no appreciable difference.

990. REYNARD, G. B. 635.64-2.484-1.521.6:578.08
"Dunking" tomatoes for their health.
 Sth. Seedsman 1942 : 5 : No. 1 : 10, 30.
 (From Exp. Sta. Rec. 1942 : 87 : p. 539.)
"Dunk" tomatoes.
 Seed World 1942 : 52 : No. 10 : p. 35.

The authors describe a method successfully used to test the resistance of seedling tomato plants to grey leaf spot (*Stemphylium*) and early blight (*Alternaria*). The tests, which can be made in winter in a greenhouse and require little space, supplement acres of summer trials. Liquid cultures of the fungi are thoroughly mixed in an electric stirrer until broken into fine particles, when the potted seedlings are dipped therein, thus covering both leaves and stems with thousands of particles of the fungi. After two days in a moist chamber the plants are then placed on greenhouse benches for observation. Field use of this technique was found to give comparable results, enabling the rapid discovery of resistant seedlings and elimination of susceptible ones in the breeding and selection programme.

991. BARRATT, R. W. and 635.64-2.484-1.521.6:581.1
 RICHARDS, M. C.
Investigations in the relationship between *Alternaria* blight and "physiological" maturity in the tomato plant.
 Phytopathology 1943 : 33 : p. 1. (Abst.).

A study of some of the factors affecting "physiological maturity" in the tomato and their relationship to resistance to *Alternaria solani* indicated that those factors that delayed "physiological maturity," e.g. defruiting and late planting, retarded defoliation by *Alternaria* while factors hastening physiological maturity, e.g. early planting and partial deleaving, accelerated the defoliation.

Certain lines chosen for resistance in 1941 were found in 1942 to be not resistant but only varieties maturing later. R. M. I.

992. HOLMES, F. O. 635.64-2.8-1.521.6:575
Derivatives of tomato that tend to escape tobacco-mosaic disease.
 Phytopathology 1943 : 33 : p. 19. (Abst.).

Hybrids of *L. esculentum*, ♀ (susceptible to tobacco mosaic virus) and *L. chilense* ♂ (resistant) were nearly as susceptible as the female parent but certain seedlings of later generations were very resistant and it remains to be seen whether this resistance can be combined with the quality of cultivated tomatoes. R. M. I.

993. ZAUMEYER, W. J. and 635.65-2.8-1.521.6:575.11
 HARTER, L. L.
Genetic studies of symptom expression of bean mosaic virus 4.
 Phytopathology 1943 : 33 : p. 16. (Abst.).

Differences in reaction to bean mosaic virus 4 were studied from the genetic point of view and it was found that the type producing local lesion was due to a single dominant factor. Heterozygous plants could not be distinguished from the homozygous while the recessive plants developed systemic mottling ten days after inoculation.

Varieties bearing this dominant gene are considered resistant for commercial purposes. R. M. I.

994. WADE, B. L. 635.652(73)
Snap beans for marketing, canning and freezing.
 Fmr's Bull. U.S. Dep. Agric. 1942 : No. 1915 : Pp. 14.

A number of snap bean varieties grown in America are described to show the qualities which they possess, such as disease resistance and absence of strings, and it is pointed out how determination of the best variety depends mainly upon local conditions. Maturity varies considerably according to locality and from one season to the next.

995.

HASTINGS, W. R.

635.652:575(73)

635.653:575(73)

The All-Americas . . . they are important.

1943 winners should be featured by dealers on counters, in catalogs, in advertising.

Sth. Seedsman 1942 : 5 : No. 11 : 20, 24.

HASTINGS, D. M.

The All-Americas . . . they are important.

All-America judge selects certain flowers and vegetables as suitable for southern conditions.

Ibid 1942 : 5 : No. 11 : 21, 28.

The writers point out that new varieties must be provided which contain the vitamins and minerals necessary to keep up health, and for use in America and other countries after the war. At the end of the first article the editors mention that the pole snap bean referred to previously as No. 439 has been named Potomac, and the green-seeded Henderson type of bush lima bean has been named Cangreen.

The Marketeer cucumber and Jubilee tomato, the Potomac pole snap bean variety and the Cangreen bush lima bean varieties, are described.

996. TOWNSEND, G. R. and

WADE, B. L.

635.652:575(75.9)

Close-up of something new in snap beans. Two varieties developed for Florida resist rust, mildew, common mosaic and are heat and drouth tolerant.

Sth. Seedsman 1943 : 6 : No. 3 : 9, 40.

A detailed description is given of two new varieties of snap bean, Florida Belle and Florida White Wax.

Florida Belle is a selection from a cross between Stringless Black Valentine and a sib of U.S. No. 5 Refugee, back-crossed subsequently with Stringless Black Valentine. The plant is more productive than Stringless Black Valentine or Tendergreen. The pods are carried fairly high but well covered and have an attractive light green colour.

Florida White Wax is a selection from the cross Brittle Wax x a sib of U.S. No. 5 Refugee, and is fairly productive. The pods are borne well below the foliage and are almost white in colour. The pods of both selections are of an excellent quality, are brittle and without strings while the side wall fibre is medium.

Both plants are resistant to some forms of rust and mildew, and to common bean mosaic. They are also tolerant to heat and drought.

997. LEBEDEFF, G. A.

635.652:581.48:575.11

Inheritance of hard-seed production in common beans (*Phaseolus vulgaris*).

Genetics 1943 : 28 : p. 80. (Abst.).

The seeds of 36 selections of common white beans were dried over CaCl_2 to ten different moisture contents, ranging from 14.11 to 5.59 %. With each reduction in the seed moisture content the percentage of hard seeds increased while the rates of their softening slowed down. Individual selections differed greatly in their response to the treatment; the F_1 seed generation was generally intermediate between the two parents, but in one cross it was intermediate only during the first seven days of the germination test; in another cross the rate of softening of the hard seeds of the F_1 seed generation was considerably lower than in either of the parental selections.

998. STARK, F. C. (jun.) and

MAHONEY, C. H.

635.652:581.6

A study of the time of development of the fibrous sheath in the side-wall of edible snap bean pods with respect to quality.

Proc. Amer. Soc. Hort. Sci. 1942 : 41 : 353-59.

Tough strings have been removed from edible snap bean pods by breeding. Thus the most important character influencing the quality of the canned pack is the "fibre of the side wall" of the pods.

Giant Stringless Green Pod and Bountiful varieties were chosen because the former does not

exhibit a very pronounced toughening of the side wall of the pods while the other does in the more mature edible pods.

It is shown that the "fibre of the side wall" is actually the inner mesocarp.

Conditions of high temperature and low rainfall have an accelerating effect on the thickening of the cell walls of the inner mesocarp; the effect is greater in the pods of Bountiful. This thickening is due to the deposition of hemicellulose.

999. ANDERSON, M. E. 635.652:581.6:575(73)
Bean improvement.

West. Cann. Pack. 1942 : 33 (12) : 19-20.

The author discusses the early and more recent results of bean improvement as regards disease resistance and the quality of the pod.

An attempt to produce a Blue Lakes, which would be stringless in the old as well as the young stages of development, resulted in Rogers Stringless Blue Lakes, which comes from a cross between Blue Lakes and U.S. No. 3 (a stringless rust resistant variety).

1000. DUNDAS, B. 635.652-2.421.1-1.521.6:575.11
Further studies on the inheritance of resistance to powdery mildew of beans.

Hilgardia 1941 : 13 : 551-65.

Determinations were made of the susceptibility to powdery mildew (*Erysiphe polygoni*) (form 1) of the F_1 , F_2 and F_3 of crosses between resistant and susceptible varieties and between resistant varieties of beans (*Phaseolus vulgaris*). The F_1 and F_2 plants were tested by inoculating detached leaflets in petri dishes. The F_3 of some crosses were tested by this method, and the F_3 of other crosses by field inoculations.

The parent varieties Striped Hopi, Lady Washington, Hungarian, *P. vulgaris* 5053, Long Kidney and Pinto, were shown by both methods to be resistant; Pink was resistant in the field and in dish tests developed resistance in late growth stages; Robust, Small White, Kotenashi and Red Kidney showed susceptibility in both tests; Long Roman was susceptible in dish tests and semi-resistant in the field.

Crosses between resistant and susceptible varieties gave resistant F_1 plants and ratios of three resistant to one susceptible F_2 plants, indicating that resistance was controlled by a single dominant Mendelian factor. This was supported by the results of tests on the F_3 plants.

Resistant F_1 , F_2 and F_3 plants were obtained from crosses between resistant varieties, showing that all these varieties carried the same single Mendelian factor for resistance.

1001. KENDRICK, J. B. and 635.652-2.484:576.16
 SNYDER, W. C.
Fusarium yellows of beans.

Phytopathology 1942 : 32 : 1010-14.

Describes a new form of *Fusarium oxysporum* known as *F. oxysporum* f. *phascoli*, n.f., a vascular parasite of *Phaseolus vulgaris*, which causes Fusarium yellows of beans. R. M. I.

1002. 635.653:577.16
Frozen beans retain vitamin C.

Seed World 1942 : 52 : No. 12 : p. 35.

Tests on the vitamin C content of snap beans, wax beans and lima beans showed that the vitamin is better preserved by quick freezing and frozen storage than by canning. Twelve varieties of frozen lima beans were analysed by the Utah station; vitamin C values were higher in the green than in the white varieties and the small beans had a higher value per unit weight than the large ones. R. M. I.

1003. LIPPISCH, A. 635.655(43)
Sojaanbau in den Alpen- und Donau-Gauen. (The cultivation of soya bean in the Alpine and Danube districts).

Obst- u. Gemüseb. 1942 : 60 : 142-43.

Describes briefly the cultivation of the soya bean and the organization of a "soya ring" for the assistance of the cultivators. R. M. I.

1004.

635.655:575(43)

Foreign countries conducting many soybean research problems.

Soybean Digest 1940 : 1 : No. 2 : p. 12.

The countries are given where extensive soya bean breeding programmes are in progress. Serious attempts are being made in Germany to establish the culture of soya beans. The aims of the German plant breeders are given.

1005. DIMMOCK, F.

635.655:575(71)

Canada includes many excellent soybean acres.

Soybean Digest 1941 : 1 : No. 7 : p. 5.

The varieties of soya beans grown in Canada are of good quality and give satisfactory yields. Mention is made of the new varieties which were developed at the Dominion Experimental Farms and it is stated that better adapted varieties are expected as the result of recent introductions and hybridization.

1006.

635.655:575(73)

Genetic studies.

Soybean Digest 1942 : 2 : No. 7 : p. 4.

Genetic investigations in co-operation with state experimental stations are planned to give particular attention to chemical factors such as oil and protein content in the new varieties. Three promising varieties produced are Chief, Patoka and Gibson, while a fourth, adapted to northern regions, is expected this year. This latter variety is superior in oil content and iodine number of oil in addition to having improved agronomic characteristics.

E. K. J.

1007.

635.655:575(73)

635.655:581.148:631.521.6:575

New varieties released at three stations.

Soybean Digest 1941 : 1 : No. 5 : p. 3.

By hybridization and selection over a period of years three "non-pop" soya bean varieties have been produced at Tennessee. The varieties which are named Ogden, Volstate and Tennessee Non-pop have one common parent Tokio, which was also used as a standard for comparison of yields of hay and seed.

The Volstate and Tennessee Non-pop varieties give high yields of hay and yellow coloured seeds. They are late maturing, having about the same length of season as Tokio.

Ogden is perhaps two weeks earlier than the others and gives a good yield of hay and seeds, which are coloured light green.

At Ithaca, N.Y. an extremely early maturing variety named Ontario has been selected from U.S. 65344. This variety is not outstanding in yield and is rather short in stature but it always matures under New York conditions, is yellow in colour and has given an average oil percentage of 20.03.

A selection from a hybrid between Illini and a strain of Manchu was obtained at Urbana. Formerly Type 119, it is named Chief and has yellow coloured seeds of about the same size as those of Illini. On the average the plants are six inches taller than Illini plants and mature about five days later under local conditions. They have the same resistance to lodging and shattering as Illini.

1008.

635.655:575(77.2)

New Indiana varieties.

Soybean Digest 1942 : 2 : No. 10 : 2, 11.

Two new soya beans are described: the "Gibson", a hybrid between Dunfield and Midwest, and "Patoka", a pure line selection from an introduction by the Division of Plant Exploration. Both are late maturing yellow seeded varieties and give higher yield of better quality than the available yellow seeded varieties.

E. K. J.

1009.

635.655:575:551.566.3

Dakotan believes soybean acres can be pushed northward . . .

Soybean Digest 1941 : 1 : No. 7 : 4-5.

A number of soya bean varieties raised in Manitoba were successful when grown in North Dakota. Varieties which had been tested at Arlington and found to give small seeds produced large seeds in this area.

Different types have been segregated and include short stemmed early varieties which produce

very large beans, plants with tall slender stalks and small beans, which should be useful for hay, and a number which produce more ordinary types of plants with good yields of beans of a variety of colours, but mostly yellow. Several good kinds are without hilum colour. About half a dozen types of soya beans and a number of other vegetable seeds obtained from Sweden, have done exceptionally well.

1010. TORSSELL, R. 635.656:581.6:578.08(48.5)

Kvaliteten hos kokärter v 1940 och 1941 års skörd samt hos bruna bönor av 1941 års skörd. (**Quality in garden peas of the 1940 and 1941 harvest and in brown seeded beans of the 1941 harvest**).

Sverig. Utsädesfören. Tidskr. 1942 : 52 : 419-32.

The methods described for testing the quality of samples of garden peas (collected mainly at various centres in central and eastern Sweden) and of brown seeded beans (mostly from Skåne) were directed primarily to the determination of cooking quality.

Of the 215 pea samples 92 were Torsdags and 37 Gyllen and the remainder included Ambrosia, Munk and the Östgöta pea. Of the 67 samples of beans 17 were of the Stella variety.

In both the peas and beans a correlation was found between higher 1,000 seed weight and improved cooking quality. No such relationship was found between water content and cooking quality. Gyllen appeared somewhat superior in cooking quality to Tordags.

1011. WADE, B. L. 635.656-2.111-1.521.6:575(75.7)

Wando pea has that "something extra". High quality plus cold tolerance makes pea valuable as home garden type and as parent in breeding projects.

Sth. Seedsman 1942 : 5 : No. 11 : 7, 31, 34.

In the spring of 1933 a cross was made between the Laxton Progress pea and a hardy Perfection type which had shown some tolerance to hot weather conditions. In 1936 a bulk lot of this hybrid which was named Wando and the parents were brought to the U.S. Regional Breeding Laboratory at Charleston. The parents failed to survive the hot spring, but some of the hybrids survived and appeared to be vigorous and productive. Since the survivors were not market garden types and appeared to be of no special value under local conditions, the cross was carried as a bulk line.

Since the hybrid withstood the February and autumn frosts of 1939, pure line work was begun. Wando was tested with nine other pea varieties and hybrid strains during the winter of 1941-42 and showed a tolerance to frost which was only exceeded by Australian Winter. Wando has given a yield of 18 to 20 bushels of good quality seed per acre; its stems remain upright despite heavy winds; it is intermediate in season to Little Marvel and Perfection. The immature seeds are described.

The writer remarks that since this new hybrid is superior to Creole in quality, hardiness and probably yield, it should be worth-while as a parent for breeding pea varieties of other types resistant to cold injury.

BOOK REVIEWS

FISHER, R. A. and

YATES, F.

519.24

Statistical tables for biological, agricultural and medical research.

Oliver & Boyd, Ltd., London and Edinburgh 1943: 2nd ed. 13s. 6d. Pp.

viii + 98. 34 tables.

The second edition of these invaluable tables will be welcomed by all workers in the general field of biological statistics. The new material consists of two further tables (V_1 and V_2) for the test of the significance of the difference between two means obtained by different methods; Table VIII, which gives upper and lower limits for the expectation based on the binomial and Poisson distributions when a occurrences out of N have been observed and Table VIII₂, which gives densities of organisms estimated by the dilution method.

The combinatorial solutions of Table XVII have been considerably extended and simplified in presentation by the more extensive use of solutions of the cyclic type, while the corresponding section of the introduction now gives an account of Youden's Squares and of the method of utilizing information, formerly discarded, from comparisons between blocks. A list of errata in the first edition has also been included.

J. O. I.

MATHER, K.

519.24:57

Statistical analysis in biology.

Methuen & Co., Ltd., London 1943: 16s. 0d. Pp. 247. tables. diagrams.

This is a book written by a biologist for biologists, and is a good introduction to the use of most methods of statistics which are required by biologists. The author has succeeded in reaching a satisfactory compromise between the type of book which is so mathematical as to be unreadable by the biologist, and the opposite type which is a pure catalogue of methods to be used by rule of thumb.

After an introductory chapter on the nature of statistics, populations and samples and diagrams, and another on probabilities and significance, an account is given of the normal, binomial and Poisson distributions. A description is then given of the t , z and χ^2 distributions, and their interrelations. There follow chapters on the significance of sums and means, degrees of freedom and the analysis of variance, the planning of experiments, regressions and correlations. The use of χ^2 in the analysis of frequency data is described fully and finally there is an account of the estimation by the method of maximum likelihood.

The reviewer agrees with the author that the biologist should be able to understand a certain amount of algebra, and that some elementary algebra on topics such as the partitioning of degrees of freedom or the partitioning of χ^2 should be helpful towards understanding the general methods. It is thought, however, that the arrays of degrees of freedom given are needlessly long, and may quite easily put the reader off the subject. Secondly, if algebraic proofs are given, they should be as easy and concise as possible: in this connection the algebra of the partitioning of χ^2 presented on pages 177, 179, 198 and 199, is most laborious and inelegant.

The examples chosen to illustrate the arguments are in general quite good, but the preponderance of examples from genetics in some of the chapters is unfortunate but perhaps unavoidable. It is felt that the inclusion of a chapter on the treatment of toxicological data by the method of probits would have enhanced the value of the book and a short section on other transformations of variates would be useful.

Finally, in spite of the above criticisms, this book can be strongly recommended to all biologists.

O. K.

FISHER, R. A.

519.24:631.421

The design of experiments.

Oliver & Boyd, Ltd., London and Edinburgh 1942: 3rd ed. 12s. 6d. Pp. xi

+ 236. tables.

The third edition of this valuable book differs little from the second edition.

Sections have been added on the possibilities of confounding with many factors and on the method of double confounding.

O. K.

575:633(48.5)

*Weibullsholm 70 år. En minnesskrift. (**Seventy years at Weibullsholm. A memorial volume.**).

W. Weibull A.-B., Landskrona 1941: Pp. 71. illus.

In this small volume a full historical account is given of the famous plant breeding institute started some seventy years ago by W. Weibull at Landskrona in Sweden. Starting purely as a farm, the concern soon began to produce seed of root crops, then extended to other crops and later embarked on the plant breeding activities with which it has now become associated. In 1924 for the first time the institution received a state grant, which has been continued annually ever since.

An outline is given of the breeding work with the different crops. A brief account is given of the origin and qualities of the many different varieties produced by the institute, which include root crops, cereals, herbage plants, potatoes, legumes, vegetables and ornamentals. The organization and equipment of the institute and its farms are also described.

577.17

**Cold Spring Harbor Symposia on quantitative biology. Volume X.
The relation of hormones to development.**

Biol. Lab., Cold Spring Harbor, L.I., N.Y. 1942: Pp. xi + 167. illus.

The Cold Spring Harbor Symposia have justly earned a high reputation for bringing together in a constructive way contributions which, though based on widely different experimental material and techniques, yet bear on some common feature of fundamental importance in biology. The 1942 Symposium gives an invaluable survey of our present knowledge of the role of hormones in the development of plants and animals of higher and lower orders.

In terms of the rate of advance of biological science, it is now a long time since the notion was clearly advanced and widely accepted, that the working of genes would have to be explained in terms of substances of high physiological activity, operating at low concentrations. In the sense that no single gene has yet had its operations explained in purely chemical or biochemical terms, there is still much ground to be covered before the effects of genes in the life history of the individual are as well understood as their passage from generation to generation. But the papers given at this symposium show that at least some of the main routes across this new country are being mapped.

Much of the work reported is physiological rather than genetical, providing the basic knowledge which will later be used as a guide in investigating genetic differences. The work on animals, especially mammals, having a longer history, is more detailed and generally more advanced than that on plants. The reader, however, who has been out of touch with work on plant hormones and development for two or three years will be amazed at the leaps forward which have been made. New groups of physiologically active substances have been discovered, having formative effects on leaves, as well as affecting cell enlargement. The development of embryos *in vitro* can now be controlled with considerable exactness and the development towards flowering of short-day plants can be analysed in terms of the production of precursors of an, as yet hypothetical, flower-producing hormone.

The book is well worth studying for the new ideas set forth, for the new techniques described and also for the discussions reported after each paper. It is illustrated by line drawings and half-tone plates and an index is provided.

J. L. F.

578.6

578.08

RICHARDS, O. W.

The effective use and proper care of the microscope.

Spencer Lens Company, Buffalo, N.Y. 1941: Pp. 61. 47 figs.

RICHARDS, O. W.

The effective use and proper care of the microtome.

Ibid. 1942: 25 cents. Pp. 88. 40 figs.

These two booklets published by the Spencer Lens Company should find a place in every biological laboratory. The booklet dealing with the microscope gives the bare minimum of information necessary to use a microscope properly and should be regarded as an introduction to more thorough works on the subject.

* An abridged translation of this publication is on file at the Bureau.

The booklet on the microtome deals thoroughly with the cutting of sections, from both the theoretical and practical aspects. It deserves to be studied carefully and then kept for constant reference.

J. L. F.

GARRETT, S. D.

632.421.9

The take-all disease of cereals.

Tech. Commun. Bur. Soil Sci., Harpenden 1942: No. 41: Pp. 40.

A comprehensive account is given on the morphology, physiology, life history and attack of the fungus *Ophiobolus graminis*, which is responsible for the take-all disease on cereal plants and grasses, together with the methods by which it may be controlled. The extent of this bulletin may be judged in that over 100 papers are mentioned and, where they differ, the views of one author are compared with those of another.

Emphasis is laid on the economic importance of this disease which brings about great losses over wide areas.

The following are some of the points of interest. The agricultural importance of grasses as hosts lies in the indefinite survival of the fungus in pasture between one susceptible cereal crop and another. Oats are highly resistant to *O. graminis* proper but they are susceptible to var. *avenae* Turner. Greater resistance is shown by older wheat plants which may be attributed in part to an increased capacity for production of fresh crown roots to replace those destroyed by the disease. The wide host range *O. graminis* on cereals and grasses suggests that the search for a resistant wheat variety is unlikely to be successful.

633(73)

575:633

RATHER, H. C.

Field crops.

McGraw-Hill Book Company, London and New York 1942: 26s. Pp. ix + 454.
130 figs.

This new text book deals with North American field crops and is intended principally for the use of agricultural students.

The first five chapters are general in scope and the succeeding chapters deal with pasture and forage crops, cereals, pulses, roots, sugar cane, cotton, tobacco and finally crop improvement.

To the non-American reader the interest of the book lies in the picture it gives of American methods of crop production and, not being too didactic, it can be recommended from this point of view. Accounts are given of the production of seed of herbage crops and, in the chapter on crop improvement, of seed certification schemes. A rather practical outlook is maintained throughout; perhaps this is why the difference between mass selection and progeny testing is obliterated.

J. L. F.

633.16:582

ÅBERG, E.

633.16:576.16

**The taxonomy and phylogeny of *Hordeum* L. Sect. *Cerealia* Ands.
with special reference to Thibetan barleys.**

A.-B. Lundequistas Bokhandeln, Uppsala 1940: Pp. 156. 20 pls. maps.
(Symb. Bot. Upsaliens. IV, 2).

The impetus for the work reported in this monograph was the study of a collection of naked, cultivated barleys brought from Eastern Thibet by H. Smith. The discovery in this material of a new, six-rowed, wild species, *Hordeum agriocriton* E. Åberg (first described in 1938) and dissatisfaction with the existing classifications led to the undertaking of a study of the classification and phylogeny of the whole section *Cerealia* of the genus *Hordeum*.

Very briefly, the author recognizes five species in the section. The six-rowed wild species *H. agriocriton* E. Åberg is regarded as representing the ancestor of all the wild and cultivated barleys, the other wild species, *H. spontaneum* C. Koch, being regarded as derived from it by reduction of the lateral spikelets. *H. vulgare* L. emend. Lam. comprises the cultivated six-row types and is directly derived from *H. agriocriton* by loss of the brittleness of the rachis and delayed germination characteristic of the wild species of barley. The two-rowed cultivated forms are grouped under *H. distichum* L. emend. Lam. which may have been derived, by reduction of the lateral spikelets, from *H. vulgare* or alternatively from *H. spontaneum*. The third cultivated species recognized, *H. intermedium* (Kcke.) Carleton, with varying fertility of the lateral spikelets, is regarded as derived from crosses between two- and six-row forms and therefore the youngest of all the species. The possibility is also mentioned that *H. distichum*

has emerged on occasion from crosses between *H. spontaneum* and *H. vulgare*. With regard to the status of these five species, it is shown that they are inter-fertile and give fertile hybrids; all are diploids but the occurrence of satellites needs further study.

The types found in Smith's collection are described in some detail and attention is paid to their potential value as breeding material. Their high protein content has value for the development of fodder barleys. Stiff straw, large kernels and resistance to mildew and rust are other valuable features found. Vernalization studies showed some of them to be true winter forms. A number of new botanical varieties of *H. agriocriton* and *H. vulgare* are described for the first time and Latin diagnoses are given of these and of certain varieties previously only described in Russian.

Crossing experiments with wild and cultivated varieties showed brittleness of rachis, two-rowedness of ear, violet colour of the lemma and great hairiness of the glumes and the edge of the rachis to be dominant characters.

The distribution of the different types is described and there is much valuable discussion of systems of classification. The monograph should be a permanently valuable contribution to the phylogeny and classification of an important cultivated plant. A bibliography is provided and the work is illustrated by half tone and coloured plates and by maps. J. L. F.

GREGORY, W. C.

633.881.6:576.312.35

Phylogenetic and cytological studies in the Ranunculaceae Juss.

Trans. Amer. Phil. Soc. 1941: 31: 443-521.

This cytological study of the *Ranunculaceae* was designed with a view to the possible reclassification of the family and to elucidate certain aspects in its evolution and speciation. New chromosome numbers of 43 species from 8 genera are reported for the first time and include two species of *Aconitum*; *A. reclinatum* Gray, $n = 8$ and *A. uncinatum* L., $n = 8$. The basic chromosome numbers selected for the *Ranunculaceae* are 5, 7, 8, 9 and 13. In the 7 and 8 series a high degree of polyploidy has been reached with $2n = 154$ and 128 respectively. Based on chromosome type, size and basic chromosome number a new phyletic arrangement is suggested for the family. R. M. I.

LLOYD, F. E.

633.913

Guayule (*Parthenium argentatum* Gray): a rubber-plant of the Chihuahuan Desert.

Carnegie Institution of Washington, Washington, D.C. 1911: Pp. viii + 213.
46 pls.

Published in 1911, this monograph on guayule (*Parthenium argentatum* Gray) has been reprinted in response to the present demand for all available information on rubber from plants other than *Hevea*. The studies here recorded were made in Mexico where the plant is native in the desert regions. It is noted in the historical account that there is evidence that pure rubber, probably derived from the guayule by a process of mastication, was known to the natives of Mexico before the Spanish conquest. Details are given of the environment, the morphology of the plant, methods of reproduction, anatomy and histology, the resin canals, the origin and occurrence of the rubber, methods of vegetative reproduction and cultivation. A reprint is included, a paper by Dr Lloyd published in 1932 on the "Mode of occurrence of caoutchouc in the guayule, *Parthenium argentatum* Gray, and its function" in which a correction is made of the observations first suggested in the account published in 1911, and it is shown that the rubber in guayule is a latex stored in certain cells of parenchyma but unlike *Hevea* the cells do not break down to form tubes. This reprint concludes with a bibliography of other papers on guayule by the same author.

Taking "mill weight" as a basis, the percentage of pure rubber in the whole plant is 7.8. While possible differences in strains or individual plants are not specially considered it is clear that the rubber content can be increased by suitable cultural operations. R. M. I.

HALL, H. M. and

LONG, F. L.

633.913(73)

Rubber-content of North American plants.

Carnegie Institution of Washington, Washington, D.C. 1921: Pp. 65. 3 pls.
14 tables.

Even in 1921, when this pamphlet was published, it was realized how important it was that the United States should not be entirely dependent on the goodwill of other nations for her supply

of rubber. Though the magnitude of the problems to-day confronting America and her allies was hardly envisaged a beginning was made to find some plant or plants that could be grown for rubber production in the United States. Sixty-four species were examined and found to contain rubber and of these, most of which belong to the genus *Asclepias* or true milkweeds and *Apocynum*, 16 are treated in some detail. The rubber content was estimated by means of the acetone-benzene method. It was found that the amount of rubber varied with the variety or the strain, which suggests that breeding and selection may play a part in increasing the output. Seasonal variation as well as variation in successive crops were also noted. The most promising species was *Asclepias subulata* whose stems contain 2-6.4% of rubber while the rubber of *Apocynum cannabinum* with 0.7-5.1% was probably of superior quality. Other aspects of the problem also briefly considered are: the possibility of by-products from the plants and the cultivation of the plants on poor soil where they would not be in competition with other crops.

R. M. I.

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